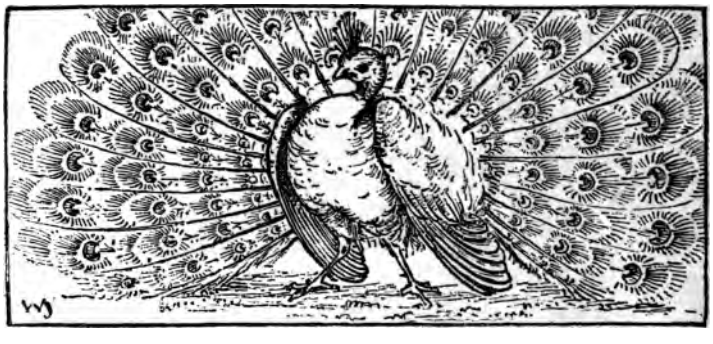
A HANDBOOK
FOR
PAINTERS & ART STUDENTS
ON THE USE OF
COLOURS ETC.

MUCKLEY

APPROVED BY
THE SCIENCE AND ART
DEPARTMENT

A

HANDBOOK



ON THE USE OF COLOURS,

ETC.

APPROVED BY THE SCIENCE AND ART DEPARTMENT.

A HANDBOOK

FOR

PAINTERS AND ART STUDENTS

ON THE

CHARACTER, NATURE, AND USE OF COLOURS,

THEIR PERMANENT OR FUGITIVE QUALITIES, AND THE VEHICLES PROPER TO EMPLOY.

ALSO

SHORT REMARKS ON THE PRACTICE OF PAINTING IN OIL AND WATER COLOURS.

BY

WILLIAM J. MUCKLEY,
AUTHOR OF 'THE MANUAL OF ARTISTIC ANATOMY,' ETC.

SECOND EDITION.

LONDON:
BAILLIÈRE, TINDALL, AND COX,
20, KING WILLIAM STREET, STRAND.
1882.

TO

EDWARD J. POYNTER, ESQ., R.A.

THIS HANDBOOK

FOR THE USE OF PAINTERS,

AND ART STUDENTS,

IS VERY RESPECTFULLY

DEDICATED

BY THE AUTHOR.

Extracts from a Letter written by E. J. POYNTER, Esq., R.A., to the Author, and printed by permission.

MY DEAR SIR,

I have read through your work on Colours, etc., which, as being the result of your own experience, cannot but be of great value both to students and painters.

The colours which you recommend are those which I have been in the habit of using, and though the palette thus composed is limited, it comprises colours brilliant enough for most purposes, as may be seen in your own flower-groups.

It cannot be too strongly impressed on students of painting, that the use of such brilliant colours as orange vermilion, for instance, in flesh-painting, is not only dangerous, from the uncertainty attending the preparation of the pigment, but unnecessary, and destructive, moreover, of the purity and delicacy of the tints; it is worse than useless to employ a bright colour which has to be qualified by an admixture of other pigments to break its harshness, when a simple earth would be sufficient for the purpose. As a rule, purity is lost, rather than gained, by the use of colours more brilliant than is necessary.

All your remarks on vehicles, habits of painting, etc., seem to me admirable.

Yours very truly,

EDWARD J. POYNTER.

28, *Albert Gate, S.W.*

PREFACE.

THERE have been several books published in this country intended to instruct the painter in the proper use of colours and vehicles, etc. These works have not had the consideration which they have deserved, being, I suspect, either too diffuse or not sufficiently ready and practical for the painter's use. Be this as it may, many pictures produced at the present time are undergoing rapid changes, sometimes even before they leave the studio of the painter, so that in a few years hence, it is probable little will remain of their original beauty. This clearly shows how small an amount of knowledge has been acquired by the painter of the chemistry of colours, their stable or fugitive character, their action on each other, or the vehicles necessary to convey them to canvas.

The present Handbook is intended to supply, in a

ready and concise form, what is required in this direction.

The durability of a picture ought to be a matter of conscientious consideration with every painter. If he does not employ ordinary precaution in order to prevent or modify those changes which may take place in his works, sooner or later, after they leave his hands, he is to a great extent responsible, if not culpable.

The purchasers of pictures rarely consider this question. It therefore becomes all the more imperative on the painter's part, that he should thoroughly deal with it as a necessary part of his education and practice, or in ignorance he may lay himself open to the charge of supplying to his client that which he did not bargain for.

It is frequently discovered that the work which has been so well paid for in many cases, is visibly deteriorating every year, and almost every day.

Suggestions are offered in this manual on various other matters connected with the practice of art. They have grown out of a long intercourse with students, all of whom required information of the kind, not only at the beginning of their career, but for some time afterwards.

Short remarks have also been made on the methods of painting as practised by the old masters, which may perhaps lead students to investigate, and afterwards to form systems of working for themselves.

Various causes of the deterioration of pictures have been pointed out, and the remedy suggested.

Hints are given on the treatment pictures ought to receive after they leave the hands of the painter, as they are often ruined from want of a little knowledge of this kind.

In preparing this Handbook the author has referred to Field's 'Chromotography,' the works on colours and varnishes, etc., by Cennino Cennini, Bouvier, Merimée, Chevreul, Tingry, and others, as well as personally to some of the best chemists in the country; but most of the information offered, both on the preparation of colours and vehicles, and the use of them, is from the personal investigation, experiments, and practice of the writer.

W. J. M.

PREFACE TO SECOND EDITION.

THE present edition of this Handbook, is a careful revision of the former, and to which a few pages of new matter have been added.

The want of so ready a means for obtaining the information which this work offers, together with the kindly manner in which it was introduced, as well as the favourable reviews of the press, probably explain the quick sale of the first edition.

It is, however, gratifying to the Author to find that his efforts so far have proved useful.

W. J. M.

CONTENTS.

A HANDBOOK

FOR

PAINTERS AND ART-STUDENTS

ON THE

USE OF COLOURS, VEHICLES, ETC.*

PIGMENTS, AND THEIR RELATION TO EACH OTHER.

For the purpose of enabling the painter to acquire readily the knowledge relating to the materials to be used by him, the information in this handbook has been condensed to as few pages as possible.

The permanent colours have been the most fully described. With them, nearly everything in nature may be imitated. It was not necessary to enter so much into detail with the others, except as a caution.

Those colours which are of the second order of permanence, have been merely referred to. Those which are absolutely unsuitable for painting, from their fleeting nature, etc., have been simply named.

There could be no object in making further

* The first Edition of this manual was in the press, some weeks before Mr. Holman Hunt read his paper on "Painters' Materials," at the Society of Arts, April 21st, 1880, and its appearance at that time was purely a coincidence.

reference to them, for so far as the painter is concerned, they are worse than useless to him, and the preparations alluded to as fugitive should be strictly avoided.

PERMANENT COLOURS.

THE colours which may be safely employed by the painter, and which are the most eligible and permanent, are given in the following list:

WHITES.

Previous to the discovery of oil-painting, the whites in use were chiefly pipe-clay and whiting, combined with animal glue size. These substances were employed in the composition of grounds, and they were also mixed with pigments, being at the same time nearly imperishable.

When painting in oil was first practised in the fourteenth century, White lead does not appear to have been introduced as a pigment, but only as a dryer.

At this time the hard white ground of whiting and size, with which the panel was prepared, served for all purposes of light in the picture. The oil-colours were laid on it, much in the manner of the pure water-colour painting of our own time. On the whiteness of this ground, depended the brilliancy of the colours and the work generally. This process

is very visible in all the early works produced with oil-colours. The frequent introduction of white lead as a pigment, came immediately afterwards, and from that time to the present, it has always been employed in oil-painting, in connection with works of art.

The white obtained from Zinc, is of more modern discovery.

White lead, and Zinc White, when properly prepared, have been found sufficient to supply all the whites that are necessary for oil-painting. They break up stable pigments into tints very satisfactorily, giving body to them all; and used alone, they may always be relied on.

Zinc White, and Flake White. The former is not so dense in body as Flake White, but it is more permanent.

In winter time, Zinc White does not dry well, unless assisted, and in warm weather it also requires a little help. When well prepared, it is a very eligible pigment, and may be always used, either pure or in combination with other pigments, with perfect safety.

Whites made from lead, such as Flake White, were always employed by the old painters in oil-colour. When well prepared, and the conditions have been favourable, Flake White has been found to be permanent. It appears, however, to lose its opacity by age. When painted thinly over a dark surface, this pecu-

liarity becomes very visible in a few years. The dark parts show through the white lead more and more as time goes on, until at last the very thin passages of white disappear altogether. Impure air, and sulphuretted hydrogen, turn white lead to a dirty brown in a short time.

Whites from lead should never be used in water-colour painting. In many of the drawings by the old painters, patches of black occur, where the high lights were introduced. This is due to the use of white lead.

YELLOWS.

No permanent true yellow pigment appears to have been discovered by the ancients suitable for the painter's use. Throughout the middle ages, all the yellows introduced were fugitive, and although many yellow pigments are now offered by the artist's colourman, no thoroughly satisfactory one has yet been discovered.

It has been supposed that the early painters in oil, had bright permanent yellow and orange preparations. It must be confessed that these colours in old pictures, sometimes look rather bright, but this is chiefly in consequence of the dark and sunken condition of the surrounding colours. If examples of pure yellow and orange hues, be actually compared with the most perfect colours of the same kind in old pictures, it will be found that these latter are so dull, that Naples Yellow, or Yellow Ochre

and white, might have supplied the yellow, and the same colours, with Vermilion, produced the orange hues alluded to.

Lemon Yellow has hitherto had the reputation of being permanent, and this has induced the unlimited and unguarded use of it.

It is, however, as now prepared, quite unfit for the palette. It is also another example of the fact, that whatever opinions may be pronounced on the qualities of a pigment, the discriminating painter alone is the only true judge of its fitness for his purpose.

Since the former edition of this work was published, the Author has carefully re-examined the various preparations of Lemon Yellow offered to the painter at the present time, and he has found them all to change rapidly, whether used separately, or in combination with other colours. It is, therefore, necessary that this colour, as now made, should be regarded as fugitive, and of the third order of stability. It is usually a Chromate of Strontia.

Orient Yellow has been much extolled and recommended by some chemists, as being perfectly eligible for painting purposes, and it has been much employed in consequence. Nevertheless, Orient Yellow is a most fugitive pigment, and should never be used. In combination with certain colours, it will change in a few hours.

The transparent vegetable yellows have been used

in combination with blues, to form greens, during the last three centuries. In all cases these yellows have flown away, and only the blue colour with which they were originally mixed has remained.

This change is best seen in fruit and flower pictures, and more especially in the works by Van Os, and Van Huysum.

The opaque yellows from arsenic, used at various periods since the introduction of oil-painting, have nearly all gone; but not in the manner of the transparent pigments, for the arsenic yellows have injured all colours with which they have come in contact.

ORANGE HUES.

Bright and stable orange pigments were also unknown in ancient times. Those used in the middle ages were unsuitable for painting, whether mixed in oil or distemper vehicle. The most permanent that could be made were produced by mixing the ochres or Raw Sienna with Vermilion. The hues so obtained were not very bright, but they have proved stable. In modern times, down to the discovery of the oranges from cadmium, and Orange Vermilion, no good orange colour had been found out. These two last pigments when well made, and unadulterated, resist the usual unfavourable influences, and are of the greatest advantage to the painter.

The orange hues prepared from arsenic, and employed during the sixteenth and seventeenth centuries, and even later, have nearly all turned either

to dirty brown or black. When Yellow or Indian lakes have been mixed with Rose Madders, to produce orange hues, they have become fugitive, leaving the madders as though nothing had been combined with them.

YELLOWS, AND ORANGE HUES.

Aureolin. Naples Yellow. Yellow Madder. Yellow Ochre. Transparent Golden Ochre. Raw Sienna. Burnt Sienna. The Orange Cadmiums. Orange Vermilion. Field's Orange Vermilion.

Aureolin—this is a new colour, having been discovered only a few years ago, and is said by chemists to be very permanent. It is of most use when mixed with white and other colours, and landscape-painters will find it very serviceable. When glazed over white a pleasant tint is produced.

Naples Yellow, as originally manufactured, was composed of lead and antimony. It was permanent when used alone, or with colours which were free from iron; but when mixed with Yellow Ochre, or with any colour in which iron was present, it was not stable. It was also necessary to avoid the use of the steel palette knife, and use an ivory one, when mixing Naples Yellow with other colours. In enamel-painting it was a useful preparation.

Naples Yellow, as now made, is stable under all ordinary conditions. Lead is said to be no longer

employed in its preparation, zinc having taken the place of it. But Naples Yellow, as now sold, is oftener a combination of deep Cadmium and White lead. This colour is valuable in flesh-painting, and more especially in the highest lights.

Yellow Madder, is of a brownish-yellow hue, but very rich and transparent, also fairly stable. It is used solely as a glazing colour. With Viridian it furnishes an excellent hue for deep green shadows, and is serviceable in landscape-painting. It needs help in drying.

Yellow Ochre, is an oxide of iron, found in a natural state, and varying occasionally in the brightness of its hue.

It is quite permanent in itself, and may be safely used with all other durable colours. When mixed with the Vermilions, or Light red, it is most valuable in flesh-painting. The old masters used Yellow Ochre to a great extent.

Transparent Golden Ochre, is of the same nature as Yellow Ochre, but brighter and more transparent. It is well suited to landscape-painting.

Raw Sienna, is an earth, owing its colour to the presence of iron, and is found native. It is semi-transparent, and perfectly stable. It is very useful to the landscape-painter, and the painter of foliage. With Viridian, and the Green Oxides of chromium, it furnishes a variety of sombre but beautiful greens,

which are also quite reliable as to stability. When used in backgrounds, either with Terre Verte or Vandyke brown, in a semi-mixed state, it produces an agreeable effect.

Raw Sienna, does not dry well in winter time without assistance.

Burnt Sienna, is the earth above referred to, burnt to redness. It is of the same character as Raw Sienna, and of equal permanence, and dries much better.

Orange Cadmiums, are sulphides of the metal cadmium. These pigments are productions of the present century, and we are therefore not very well acquainted with their habits in paintings. They are said by chemists to be quite durable, when carefully made, and free from adulteration. For beauty and depth of hue, no other orange pigment approaches them. With white they produce a scale of beautiful tints, and often supply the place of Naples Yellow.

Cadmium Orange, is the only opaque and permanent orange colour to be obtained. When employed in tints, Zinc White should be used with it, although it is looked upon as stable when mixed with Flake White, or any of the lead whites. Like all the rest of the cadmium pigments, it is a preparation of that metal with sulphur. The degrees of heat to which it may be subjected, alter the colour from a lemon yellow down to a deep red.

Orange Vermilion, like all the other varieties of

Vermilion, is a sulphuret of mercury. It is a durable pigment when unadulterated and properly prepared, inclining to red rather than yellow. With white it goes well into tint, and is a good dryer. In delicate flesh-painting it may be used advantageously.

The best and most permanent Orange Vermilion is procured by well mixing a large quantity of the ordinary Vermilion with plenty of water. The lighter particles float to the top, which are of a bright orange hue. When the solution has settled for a day or so, the orange portion is then readily separated from the other part, which when dried in the usual way, is fit for use.

Field's Orange Vermilion, is a preparation much the same as the above, only manipulated more carefully. It is perhaps a little brighter in colour.

REDS.

Lasting Reds, both bright and dull, have been in use during all periods of art. Vermilion, and the reds from iron, have been employed from the earliest times down to our own.

In the middle ages, the Madders were much resorted to, and their permanent character has warranted the use of them down to the present day.

Some of the Madders to be seen in the old paintings of the fourteenth and fifteenth centuries are still very vivid. The Madders and the Vermilions are the only red pigments which appear to have kept their

original brilliancy. They are seen in the greatest perfection in old works when used on distemper grounds, but which are entirely out of keeping with the rest of the picture. This is in consequence of the faded condition of all the other colours which surround them.

Many Reds have been added to the old list, but they are either ineligible, or require the greatest care in the use of them.

Chinese Vermilion. Vermilion. Scarlet Vermilion. Extract of Vermilion. Venetian Red. Light Red. Red Ochre. Indian Red. Madder Carmine. Rose Madder. Pink Madder.

Chinese Vermilion, is of a full red hue, and not at all inclining to orange. It is in itself quite permanent, and does not interfere with any colours which are not fugitive, when mixed with them.

Vermilion, is nearly the same as the pigment above described. Its habits are also the same, and when pure, it is quite permanent. Whenever this colour can be used with white, instead of Rose Madder, the tints produced will be more lasting. When, however, Vermilion has been adulterated with the cheap lakes, which is sometimes the case, to give richness, it suffers.

Scarlet Vermilion, is also much like the two preceding colours. It is brighter, and is of a scarlet hue and quite stable when pure.

Extract of Vermilion, is the same colour as Scarlet Vermilion, only varying in the name given to it.

Venetian Red, is a preparation made by calcining sulphate of iron. It resembles Light Red, but is brighter. When well washed after calcination, it is quite permanent, and may be combined with any other stable colour with impunity. This red is supposed to have been much employed by the old Venetian painters; hence its name.

Light Red, is Yellow Ochre calcined to redness. It varies in richness according to the brightness of the Yellow Ochre with which it is made. It is much used in flesh-painting, and enters well into combination with all the other stable colours. In itself it is perfectly permanent. Both this and Venetian Red are good dryers.

Red Ochre, is found native. It is not so bright as Venetian and Light Red, and although permanent, is superfluous for the painter's use.

Indian Red, is a natural product, and a peroxide of iron. Its body is of great density, and requires more grinding than is usually given to it. This colour is much used in the shadows of flesh-painting, and is quite permanent. In the course of time it eats through white, or light colours, when thinly painted over it.

The whole of these iron reds have been much

employed in the works of the old painters, and have remained almost unchanged.

Madder Carmine, is the richest and most beautiful of all the lakes, when well prepared and free from adulteration with cochineal. The costliness of this colour induces adulteration, in which case it is not permanent; but when obtained pure, it will last hundreds of years without undergoing much change. When it is used in tints with white, Zinc White is preferable to Flake White. This, with all the other lakes, requires assistance in drying.

Rose Madder, is of the same nature as the last-named colour, varying chiefly as to hue. It is of a beautiful rose colour when pure, and may be used for glazing in flesh-painting. When mixed with Zinc White and Naples Yellow, it may also be used for the same purpose. When Rose Madder is carefully prepared and pure, it may be considered quite permanent. Some of the red draperies to be seen in the pictures by Fra Angelico and Hans Memling, as well as those in other works by the ancient masters, are painted with Rose Madder, and the colour does not appear to have either changed or faded.

Pink Madder—this is of the same character as Rose Madder, only a weaker preparation. No lakes prepared from cochineal should ever have a place on the palette, as they are all fugitive. Transparent

permanent reds are only to be obtained from madder. Copal varnish is the best dryer for madders.

BLUES.

The most perfect of all the primaries is the blue obtained from the stone known by the name of Ultramarine. It is nearly a pure colour, and quite permanent, whether used alone or in tints with white. Before the discovery of this stone, the ancients used blues produced from copper, all of which have turned to a greenish hue.

Factitious Ultramarine, and the blues produced from Cobalt, come next to the pure Ultramarine Blue in permanence. All other blues are more or less fleeting.

Some of the Cobalt preparations are produced by prolonged and intense heat. Painters who are aware of this, sometimes suppose that this ensures permanence. Such is not the case; for under certain conditions these blues change rapidly.

Ultramarine—Genuine Lapis-Lazuli. Brilliant Ultramarine. French Ultramarine. Cobalt. Cerulean.

Ultramarine — Lapis-Lazuli — is a blue stone, ground to an impalpable powder. It is the most costly of all colours, and its permanence may be thoroughly relied on. The old painters were much in the habit of using it, for even at that early date they were well assured as to its stable character. The greys in flesh were most frequently made with

a combination of Ultramarine and other colours. The blueness of the greys frequently to be seen in the flesh-tints in pictures by the old painters, is often attributable to the use of this permanent blue material, in combination with colours which were fugitive. The blue has remained unchanged, while all the other colours have faded. In the draperies of small works, no doubt this colour was used nearly pure, and has remained untarnished until the present time. Ultramarine varies much in the intensity of its colour; the deepest portions of the stone being selected for the finest and richest hues in painting. It is the nearest approach to a perfect blue that has been obtained. All other blues have either a purple or a green tendency. The various degrees of colouring matter which the stone is found to possess, give a scale of blues differing in intensity, beginning with the deepest, and ending in the blue known as grey Ultramarine ash. It is a good dryer, and quite as valuable in water-colour painting as it is in oil, working well in both mediums. This stone is found chiefly in China and Thibet.

Brilliant Ultramarine, sometimes called Factitious Ultramarine, was discovered by Monsieur Guimet, the French chemist, and prepared in imitation of the genuine blue stone, which it approaches very nearly.

This colour is permanent, and really possesses much of the beauty of the Lapis-lazuli; it is

nearly transparent, and as intense as the native colour.

When used alone in glazing, its colour is of a pure blue hue, sometimes, perhaps, inclining to purple. To the landscape-painter it is of great use.

French Ultramarine, is of the character of Brilliant Ultramarine, but not quite so bright and transparent. Although this colour is a good one, there is hardly any necessity for it on the palette, when either of the two blues already referred to are present.

Cobalt Blue, is made from the metal Cobalt; it is a useful and eligible colour. It varies in tint from those already described, and may be considered permanent. When used thinly over white, it serves as a glazing colour, but when employed in a body it is opaque. It is a good dryer.

Cerulean Blue, is prepared from Cobalt, and is of a greenish hue. Its chief use is in the formation of greens in combination with any of the yellows. It is valuable for painting drapery, and also furnishes useful tints for the landscape-painter.

When glazed thinly over white, Cerulean gives a bright and agreeable colour, and its beauty is then brought fully out. It dries well, and is permanent.

Blues from Cobalt are unaffected by strong heat. The writer has long prepared for his own use, both Cerulean and other Cobalt blues for painting in

enamel, as well as for oil-painting, and he is well assured as to its permanence.

GREENS.

The ancients were acquainted with Terre Verte, and also with greens produced from copper. The other green hues, which we find on mummy-cases, and on the walls of ancient Egyptian buildings, were most likely produced by mixing blues with such yellow or orange colours as they had at command.

Prussian and Indigo Blues, in combination with the Yellow Lakes, have furnished nearly all the dark transparent greens used at least for the last two hundred years.

Great changes have taken place in these pigments, being of a fugitive character, and varying in this respect, according to the situations of the works in which they have been present.

Numerous greens have been manufactured in more modern times. But until the discovery of the green oxides of chromium, none have proved fully eligible for the painter's use.

Viridian, and the Transparent Oxide of Chromium, sometimes called the Emerald Oxide of Chromium, are very beautiful hues. We are assured that they are permanent, although they are of recent discovery. Should their stability be proved, they will be of much value to the painter's art.

Opaque Green Oxide of Chromium. Transparent. Green Oxide of Chromium. Viridian. Terre Verte.

The two *Chromium Greens* here given are prepared from the metal chromium, and must not be confounded with greens produced by a mixture of chromate of lead (Chrome Yellow) and Prussian Blue, both of which pigments are semi-fugitive, and ought rarely to be used by the painter. Chromium Green is found in a natural state, but is of a dull hue. That used for painting purposes is usually prepared. The opaque kind is very powerful and dense, and should seldom be used pure. With any of the permanent yellows it mixes in a very friendly way. With Raw Sienna it gives a sombre and semi-transparent green. With light Orange Cadmium, a bright and useful colour is produced for painting foliage, and for landscape-painting. White may also be mixed with Chromium to great advantage. Under all conditions it is permanent. Even when subjected to a great heat, its colour is unaffected.

The *Transparent Oxide of Chromium*, is equally eligible for the painter, and may be modified with the yellows in the same way as the opaque kind.

If the landscape-painters of our time, were well acquainted with the merits of the green compounds which may be made by mixing the chromium oxides with the yellows named, they would use them more than they are in the habit of doing, as they meet every necessity, and are not only unchangeable in

themselves, but they do not affect colours that are mixed with them.

Viridian, may be looked upon as a new colour. It is transparent when used thinly, and semi-opaque used in a body. Of all the greens, it is the deepest and the richest. To the painter of foliage and the landscape-painter it is most useful, and will furnish the brightest hues of green which they may require. When combined with Aureolin, and glazed over white, it produces a fine colour, and well suited to represent transmitted light through foliage, which is usually very vivid. Viridian dries well, and is said to be unexceptionable as to permanence. This, like the two greens just described, is prepared from the metal chromium.

Terre Verte, is a green native earth, semi-transparent, and of little body. It is one of the old colours, and consequently was employed by the early painters of different countries. When mixed with Raw Sienna, a fine sombre hue is produced.

It is of such little density that it should not be mixed with opaque colours, as it would be immediately overpowered by them. In landscape-painting it is of much use, and when the painter is able to employ it with other colours in a half-mixed state, it produces a pleasant effect. It is a good dryer, and when pure quite permanent.

The greens here described, when mixed with the

various permanent yellows also referred to, leave nothing to be desired by the landscape-painter with respect to these colours, and should he produce works of a fugitive character, it must be the result for the most part of carelessness, or from the colours themselves being adulterated.

PURPLES.

In consequence of the many allusions which have been made to the Tyrian Purple of the ancients, it has been supposed that they possessed some bright and permanent pigment of that name. Of this we have no real evidence whatever. That to which reference has been made by ancient writers and others, was most probably, nothing more than a dye or colouring matter for textile fabrics, and altogether unsuited as a pigment for the painter.

In the middle ages, a permanent but dull purple pigment was prepared from gold and tin, for colouring glass of a ruby tint. This preparation would no doubt be also employed in the early works in distemper, and in the illuminated missals of that period, as it was well suited for the purpose. But the cost of producing this purple would prevent its being brought into more general use.

The madders and the blues in combination were resorted to, to supply what purple hues were then further required.

At the present time we have no addition to the palette, with the exception of Purple Madder, which

is rich, but rather dull. Indeed, nothing more is required. For the production of small works, pure Ultramarine and the madders, supply a series of beautiful hues which may always be relied upon.

For large pictures, the Factitious Ultramarine, with the madders, will serve all purposes required in the formation of purples.

Purple Madder. Burnt Madder. Gold Purple. Rubens Madder.

Purple Madder. Of purple pigments this alone is the most useful. It is a costly preparation, but in every respect is perfectly well suited for the palette, being as permanent as any other of the madders. It combines readily with all colours, dries well, and is of good body.

A colour nearly approaching Purple Madder, may be made, by mixing Factitious Ultramarine with deep Rose and Brown Madders, and is almost as eligible as Purple Madder. For touches of dark in the deepest shadows, it is very useful, both on account of its depth, transparency, and permanency.

Burnt Madder, is a brownish purple, but its costliness stands in the way of general use. It is an excellent preparation, and perfectly stable when well made.

Gold Purple, called *Purple Cassius*—it is a precipitation of nitro-muriate of gold, by a solution of

tin. This colour is expensive, but it is by far the most permanent purple pigment known.

The writer has often made this preparation of gold for painting purposes, and it is one of the most beautiful of all experiments, showing the precipitation of a metal from its solution. It is used chiefly in the manufacture of the artificial ruby, and ruby glass.

When a very brilliant purple is required, Rose Madder should be glazed over a pure white ground, and when this is dry, either of the Ultramarines referred to, may be glazed on the Madder. This method gives a bright and permanent purple. A dull, opaque, but useful and lasting purple may be made by mixing together Vermilion and the real or Factitious Ultramarine. This compound colour goes well into tint with white.

Rubens Madder, is a warm, deep, and transparent russet, very useful both to landscape and figure-painters. It is permanent, but a bad dryer, and when employed, copal varnish should be mixed with it.

BROWNS.

It is a fortunate circumstance that there is no lack of stable and eligible brown pigments, this colour being so much required in the production of paintings, perhaps even more so than any other. It enters much into the colour of backgrounds, furniture, draperies, and accessories of pictures, the shadows of objects, etc.

Sketches, pictures, or engravings, produced entirely in brown hues, are generally agreeable, while no other colour whatever, used for the same purposes, could be endured.

It has often been thought that the old painters possessed a brown pigment with which we are now unacquainted. This has been inferred from the appearance which the browns in their pictures now present. But it should be remembered that we do not see these pigments as they were when first employed, but only after time has done its work on them, and on the vehicles with which they were always mixed. It is therefore improbable that the old painters were in possession of any brown colour unknown to us.

Vandyke Brown. Raw Umber. Burnt Umber. Brown Madder.

Amongst all the browns at the command of the painter, Vandyke Brown may perhaps be considered the most useful. The Vandyke Brown of former times, and of the days of the painter whose name it bears, was made of an earthy bog brought from Cassel.

The *Vandyke Brown*, of to-day is a bituminous ochre, and nearly resembling the ancient colour of that name. It is permanent, and an excellent glazing colour, for which purpose it is mostly used, and often in combination with other transparent colours. The palette should never be set without it. When employed in a semi-mixed state with

Terre Verte, a very pleasing effect is produced. It dries well with a little help.

Raw Umber, is a native ochre. It is seldom used alone. In combination with black and white and other colours to form greys, it is valuable. It may also be employed to advantage with the primaries, to assist in taking those colours into shadow.

In backgrounds and in landscape-painting it is also very useful. It is perfectly stable, and a good dryer.

Burnt Umber, is deeper than Raw Umber in consequence of being calcined. Its colour inclines to a red brown, and is semi-opaque. Mixed with cooler colours, it forms an agreeable hue. With some painters it finds much favour, but is rarely ever employed alone. It is very permanent, and a good dryer.

Brown Madder, is another production of the madder root, and of great depth, transparency, and beauty. It is a good dryer and permanent. Both the landscape and figure painter find this colour of the greatest use. In water-colour painting it is much employed, and with excellent effect.

Rubens Brown, is lighter and yellower than Vandyke Brown. In the dark parts of pictures it will be found useful.

Permanent browns are numerous, as we have pointed out, but those named will be found quite sufficient for the painter's use.

GREYS.

A number of greys are produced and offered to the painter by the colour-maker, all of which are nearly useless. Greys of all tints can be so easily compounded with white, black, and various other pigments, that there is no necessity for the painter to trouble himself in the least about those offered in commerce. What is more, the greys made by combination in the hands of the artist, will in all probability, be found more stable than those mixed by the colourman.

These remarks apply chiefly to the painter in oil. To the water-colour painter, Ultramarine ash will be found very useful as well as permanent.

BLACKS.

Black may be said to be the negation of light and colour, and is capable of giving the greatest value to both. Most of the black pigments used by the ancients were carbonaceous substances, and they were also of a very permanent character. Those of modern times are equally stable.

Good colourists have frequently introduced black draperies and furniture into their works for the sake of contrast. When this is judiciously done, it produces an excellent and telling effect.

In the pictures by Rubens, we often see black and yellow brought together. In most of the fine portraits by Ravenstein, Rubens, Vandyke, Rembrandt, Valasquez, Antonio More, Moroni and others, the apparel and draperies, etc., are all black and white. The effect is very fascinating, while the contrast with the flesh tints is remarkable.

Blue Black and Ivory Black.

Blue Black, is one of the most serviceable of the numerous and good preparations of this kind at the command of the painter.

The best is procured from vine twigs burnt to charcoal. When mixed with white, it produces blueish tints, and may be always used in flesh-painting, both in the half-tints and in the shadows.

Ivory Black, seldom contains much of the matter from which it takes its name. It is made chiefly of bones charred to blackness. When broken up into tints with white, and Raw Umber, a series of neutral greys may be formed, which will be found very useful when painting the shadows and half-tints of white objects. Ivory Black is of greater depth and transparency than Blue Black, and may be used as a glazing colour. With Vandyke Brown it is serviceable when so employed.

In these two blacks the painter has all that is necessary of the kind. To add others, would be simply to take up room on his palette to no purpose.

PERMANENT, BUT USELESS PIGMENTS.

THE following colours are stable, but unnecessary. Those already described in the permanent list, will answer the painter's purpose much better. Nevertheless, should he be disposed to employ any of them, he may do so with impunity.

WHITES.

Blanc d'Argent, or Silver White. London and Nottingham White.

YELLOWS.

There are no permanent yellows besides those already referred to.

OCHRES.

Roman Ochre. Brown Ochre. Oxford Ochre. Stone Ochre. Di Palito, or Light-Yellow Ochre.

RED.

Cadmium Red.

BLUES.

New Blue. Blue Ochre.

GREENS.

Scheele's Green. Cobalt Green. Olive Oxide of Chromium. Olive.

PURPLES.

Mars Violet. Cobalt Purple.

BROWNS.

Mars Brown. Mixed Citrine. Bistre. Bone Brown. Caledonian Brown. Cappah Brown. Chalons Brown. Cologne Earth. Verona Brown. Manganese Brown.

GREYS.

Mineral Grey. Mixed Grey. Neutral Grey.

BLACKS.

Lamp Black. Mixed Black. Black Ochre. Bone Black. Frankfort Black. Manganese Black. Mineral Black. Purple Black. Spanish Black. Black Lead.

SEMI-PERMANENT COLOURS.

THE colours which may be placed in the second order of permanence and fitness, are here given. Under favourable conditions most of them will last a long time. But their tempting hues and inviting appearance have allured many painters to the undue use of them.

WHITES.

Cremnitz White, is sometimes known as Vienna White. It is very bright in appearance, even surpassing Flake White, but not so dense in body. It is a preparation of lead.

Cadmium White, although an attractive pigment, is liable to change when combined with other colours. It is prepared from the metal Cadmium by precipitation and other processes.

YELLOWS.

Lemon Cadmium (*Sulphide of Cadmium*), under certain conditions, will keep its colour pretty well, both in oil and water-colour when employed alone. When used in oil with Zinc White, it will also remain unchanged for years, but the white must be perfectly free from adulteration with lead, or a change may set in at once. Lemon Cadmium may be used with Chinese White in water-colour painting, and when protected by glass from foul air and from sunlight, it will last a long time unchanged.

Chrome Yellow and *Orange,* are both chromates of lead. When carefully prepared and mixed with oil, these pigments will remain unaltered for at least a quarter of a century. With white lead they go well into tints, and there is no antagonism between these colours. When, however, the chromates of

lead are employed, they should be used as simple as possible.

The Author has used Orange Chrome in the preparation of enamel colours; and it will bear a full red heat for many hours, in the presence of a vitreous flux, without undergoing any change beyond the deepening of the colour. This is, however, no test as to the permanence of Orange Chrome, when used either in oil or water colour.

Citron Yellow, known also as *Zinc Yellow,* both deep and pale, may be called chromates of zinc. Landscape painters are in the habit of using it much, as it combines well with Green Oxide of Chromium and other greens. It is also useful when imitating the yellow parts of foliage, grass, etc. By chemists it is not looked upon as a good colour. It is so comparatively new that painters are not yet fully acquainted with its habits. Deep Zinc Yellow is, however, much more fugitive than the pale kind, as it will frequently change in a few days.

Gamboge, is a gum brought from the East, and was long used as a water-colour pigment, before it found a place amongst oil-colours. It is fairly stable in water, and does not injure other colours.

REDS.

Lakes from Cochineal. In consequence of the richness and beauty of these lakes, painters are ever indulging in their use. When employed in water-

colour and excluded from light, the best preparations, such as *Carmine* and *Crimson Lake*, will last half a century without much visible alteration. In oil painting, when Crimson Lake is used alone, as a thickish glaze, and kept from strong light, it will not rapidly change. But if combined with white lead, its colour goes immediately. The pigment is obtained from an insect, found in great abundance on a cactus plant in Mexico.

Scarlet Lake, has much of the quality of Crimson Lake, and its permanence is affected by the same causes as those which interfere with other lakes of this kind, being also prepared from cochineal. Its colour can be very well imitated by Rose Madder, and a little Orange Cadmium, or Aureolin, all of which are stable.

Purple Lake, being also a cochineal preparation, is not more permanent than the two lakes already mentioned. This colour is certainly very beautiful, but when it can be so nearly matched by the madders, and additions either of pure, or Factitious Ultramarine, it should not be used.

Florentine and *Hamburgh Lakes*, are of the same character as those already described, and may not be looked on as stable pigments.

Indian Lake, appears to be made from a product, both animal and vegetable, which is brought from the East The colour is rich, deep, and inclined to

purple. It is said to be more durable than the cochineal lakes. At the same time, it must be regarded as amongst the semi-permanent pigments.

Kermes Lake, is thought by some to be the earliest lake used by the ancient Italian and German masters. No doubt it found its way to Venice early, and was used by Tintoretto, Paolo Veronese, Titian, and others. In pictures by these masters, we find colours nearly resembling Kermes Lake; nevertheless, they appear to have undergone change.

BLUES.

Smalt, is a blue glass coloured by cobalt, and reduced to an impalpable powder. Although this preparation will stand a high degree of heat for weeks together, it is not permanent as an oil-colour. It is used in enamel painting.

Another *Cobalt Blue,* of the like nature and tint as the above, is prepared from the black oxide of cobalt, ground flint (silica), and a carbonate of tin, exposed to great heat for some days. This preparation is denser than Smalt, but its stability is nearly as doubtful.

Prussian Blue is prepared from iron. It is a very fascinating colour, whether used as a glaze, or in combination with other colours. Most painters, both in oil and water colour, are in the habit of using it, but it is not durable. In water-colour,

when exposed to full light, the richness of its hue soon fades. The works by the early water-colour painters of this country bear sad testimony to this fact. The faded condition of some of the works by Copley Fielding, Varley, Girtin, Prout, Cox, Turner, and others, is chiefly the result of the use of Indigo and Prussian Blue.

Antwerp Blue, is of the character of Prussian Blue, a little brighter, and not having so much body. It is not so stable as Prussian Blue.

Cyanine Blue, is a compound of Cobalt and Prussian Blue. It is a very deep and agreeable colour, but scarcely more permanent than either Antwerp or Prussian Blue, what there is of Cobalt Blue in the compound, being permanent, and the rest is semi-fugitive.

Indigo Blue, is an ancient preparation, and a vegetable product. On the whole, it is less durable than Prussian Blue. It is nevertheless much recommended and employed by artists, more especially water-colour painters, who make use of it in clouds and distances. The skies and clouds in some of the works of Copley Fielding, and other painters of his time, are evidences of the fleeting character of Indigo Blue, when thus employed. There is little left in the works referred to, but drab masses of cloud forms, the blue tints having departed altogether.

GREENS.

Veronese Green. By some chemists this pigment is pronounced permanent. The writer has found it to be otherwise. If carefully prepared, and when used alone, it may be stable; but as it contains ingredients which attack other colours when combined with it, it is rendered, on the whole, less eligible than Viridian.

Emerald Green, is a preparation of copper, very bright, and in colour much unlike all other greens. There is hardly anything in nature resembling it; employed pure, it will last a long time, but mixed with other colours, it soon changes.

BROWNS.

Brown Pink, is a colour much used by water-colour painters. It is a vegetable production, and may be looked upon as a lake. Its colour being of a rich yellow-brown, produces fine greens, either with Prussian or Indigo Blue. Brown Pink fades in a few years, leaving the greens, of which it at first formed a part, of a cold and unnatural colour. It should therefore be used as little as possible. In oil-painting it should never be employed.

Sepias, both warm and cold, are produced from the cuttle-fish, and are very pleasant working colours in water, but fleeting.

In order to render the semi-permanent colours more lasting, when painting in oil, they should be

mixed with copal varnish before they are employed. They should also be further protected by a thin coat of copal varnish after they are dry.

The following is a summary, giving the lists of Permanent, Semi-permanent, and Fugitive colours.

These are divided from each other, so that the painter on looking down them, may at once ascertain the character of any pigment on which he may desire information.

A LIST OF PERMANENT COLOURS,

WHICH MAY BE USED EITHER SEPARATELY, OR IN COMBINATION WITH EACH OTHER.

These colours are as stable for water-colour painting as for oil, with the exception of Flake White (white lead). Chinese, or Zinc White, should always be used in water-colour painting.

WHITES.

Chinese White.
Zinc White.
Flake White (white lead).

YELLOW AND ORANGE HUES.

Aureolin.
Yellow Madder.
Yellow Ochre.
Transparent Gold Ochre.
Raw Sienna.
Burnt Sienna.
The Orange Cadmiums.
Orange Vermilion.
Naples Yellow.
Field's Orange Vermilion.

REDS.

Chinese Vermilion.
Vermilion.
Scarlet Vermilion.
Extract of Vermilion.
Venetian Red.
Light Red.
Red Ochre.
Indian Red.
Madder Carmine.
Rose Madder.
Pink Madder.

BLUES.

Genuine Ultramarine.
Factitious Ultramarine.
French Ultramarine.
Cobalt.
Cerulean.

GREENS.

Transparent Green Oxide of Chromium.

Opaque Green Oxide of Chromium.
Viridian.
Terre Verte.

PURPLES.

Purple Madder.
Gold Purple Cassius.
Rubens Madder.

BROWNS.

Vandyke Brown.
Raw Umber.
Burnt Umber.
Brown Madder.
Rubens Brown.

GREY.

Ultramarine Ash.

BLACKS.

Blue Black.
Ivory Black.

A LIST OF PERMANENT COLOURS,

FOR THE MOST PART UNNECESSARY.

WHITES.

Blanc d'Argent, or Silver White.
London and Nottingham White.

YELLOW OCHRES.

Roman Ochre.
Brown Ochre.
Oxford Ochre.
Stone Ochre.
Di Palito, or Light Yellow Ochre.

RED.

Cadmium Red.

BLUES.

New Blue.
Blue Ochre.

GREENS.

Scheele's Green.
Cobalt Green.
Olive Oxide of Chromium.
Olive.

PURPLES.

Mars Violet.
Cobalt Purple.

BROWNS.

Mars Brown.
Mixed Citrine.
Bistre.
Bone Brown.
Caledonian Brown.
Cappah Brown.
Chalons Brown.
Cologne Earth.
Verona Brown.
Uranium Brown.
Manganese Brown.

GREYS.

Mineral Grey.
Mixed Grey.
Neutral Grey.

BLACKS.

Lamp Black.
Mixed Black.
Black Ochre.
Bone Black.
Frankfort Black.
Manganese Black.
Mineral Black.
Purple Black.
Spanish Black.
Black Lead.

A LIST OF COLOURS OF THE SECOND ORDER OF PERMANENCE.

Most of these colours change when used alone. All of them change when combined with each other.

WHITES.

Cremnitz White (Vienna White).
Cadmium White.

YELLOWS.

Lemon Cadmium.
Chrome Yellow.
Citron Yellow (Zinc Yellow).
Gamboge.

REDS.

Carmine.
Crimson Lake.
Scarlet Lake.
Purple Lake.
Indian Lake.
Florentine and Hamburgh Lakes.
Kermes Lake.

BLUES.

Smalt.
Prussian Blue.
Antwerp Blue.
Cyanine Blue.
Indigo Blue.

GREENS.

Veronese Green.
Emerald Green.

BROWNS.

Brown Pink.
The Sepias.

FUGITIVE COLOURS.

The following is a list of those colours which are so fugitive or unfit for painting purposes, that they should never be used. If colour-makers would cease from manufacturing them, it would be of the greatest importance to art.

WHITES.

Flemish White, or Sulphate of Lead.
Patterson's White, or Oxychloride of Lead.
Pearl White, or Nitrate of Bismuth.

YELLOWS.

Lemon Yellow.
Cologne Yellow, or Chromate and Sulphate of Lead, with Sulphate of Lime.
Jaune Minerale, or Chromate of Lead.
Gallstone.
Indian Yellow, or Urio-phosphate of Lime.
Yellow Lake, a vegetable production.
Italian Pink, called sometimes Dutch and English Pink, a vegetable product.
Quercitron Lake, a vegetable production.
Orpiment, sometimes called

Chinese or King's Yellow, or Sulphuret of Arsenic.
Strontian Yellow, a metallic preparation.
Arsenic Yellow, prepared from arsenic.
Bismuth Yellow, or Chromate of Bismuth.
Copper Yellow, prepared from copper.
Gelbin's Yellow, or Chromate of Lime.
Indium Yellow, prepared from the metal indium.
Iodine Yellow, or Iodide of Lead.
Iron Yellow, a protoxide of iron.
Massicot Yellow, or Orange, a preparation of lead.
Patent Yellow, a preparation of lead.
Platinum Yellow, prepared from the metal platinum.
Thallium Yellow, prepared from the metal thallium.
Thwaite's Yellow, a chromate of cadmium.
Turbith Mineral, or Queen's Yellow, a sulphate of mercury.
Uranium Yellow, from the metal uranium.
Yellow Carmine.
Orient Yellow.

REDS.

Carmine, a preparation from cochineal, semi-permanent in water-colour and fugitive in oil.
Dragons' Blood, prepared from a resin brought from the East.
Red Chrome, a chromate of lead.
Red Lead, an oxide of lead.
Antimony Red, prepared from antimony.
Chica Red, a vegetable production.
Cobalt Red, from cobalt.
Copper Red, from copper.
Ferrate of Baryta Red, from baryta.
Iodine Pink, procured from iodine and mercury.
Lawson's Red.
Manganese Red, from the metal manganese.
Red Chalk.
Red Precipitate of Mercury.
Rose Pink, from Brazil wood.
Silver Red, a preparation from silver.
Thallium Red, from the metal thallium.
Ultramarine Red.
Uranium Red.

BLUES.

Blue Carmine. It is an oxide of molybdenum.
Bice, prepared from copper.
Blue Ashes, prepared from copper.
Blue Verditer, prepared from copper.
Egyptian Blue, prepared from copper.
Saunder's Blue, prepared from copper.
Schweinfurt Blue, prepared from copper.
Iodine Blue.
Iridium Blue.
Manganese Blue.
Platinum Blue.
Tungsten Blue.

ORANGES.

Mixed Orange.
Anotta, a vegetable production.
Antimony Orange.

Chromate of Mercury.
Damonico, prepared from iron.
Gamboge Orange, a gum.
Madder Orange.
Orange Lead.
Orange Orpiment, a preparation of arsenic.
Thallium Orange.
Uranium Orange.
Zinc Orange.

GREENS.

Malachite Green, a preparation of copper.
Verdigris Green, a preparation of copper.
Mixed Green.
Chrome Green, chromate of lead, with Prussian Blue.
Hooker's Green, gamboge and Prussian Blue.
Sap Green, a vegetable product.
Chrome Arseniate, from arseniate of potash and chromic oxide.
Copper Borate, from copper.
Green Bice, from copper.
Green Ultramarine, prepared from French Ultramarine.
Mineral Green, lead and copper.
Uranium Green.
Titanium Green.

PURPLES.

Violet Carmine, vegetable.
Orchil Purple, vegetable.
Bismuth Purple.
Cobalt Purple.
Prussian Purple, prussiate of iron.
Sandal Wood Purple, vegetable.
Tin Violet.

OLIVES.

Mixed Olive.
Olive Green, a mixed green.
Olive Lake, vegetable.
Burnt Verdigris.

BROWNS.

Asphaltum, mineral pitch.
Mummy, mineral and animal.
Prussian Brown, from Prussian Blue.
Bitumen, mineral pitch.
Cadmium Brown.
Chrome Browns.
Copper Browns.
French Prussian Brown, from Prussian Blue.

MARONES.

Mixed Marone.
Chica Marone, vegetable.
Chocolate, lead and copper.
Cobalt Marone.

There are other preparations, which have not been added to this list, as they are also unworthy of the painter's consideration.

VEHICLES OR MEDIUMS:

THEIR USE IN COMBINATION WITH COLOURS.

THE mediums necessary to convey colours to canvas, ought to have the serious consideration of every painter. Various kinds of vehicles have always been used for this purpose. A few of them, no doubt, have conduced to the permanence of the works in which they have been employed, while others have facilitated their destruction.

Vehicles have two functions. First, they are mixed with some colours to give them a drying property. Second, they are used to thin transparent colours, in order to make them fit for glazing purposes. They were also employed by the early painters in oil in combination with all opaque colours.

Mediums composed of drying oil and Mastic varnish have been used too freely by the English school of painters. On the other hand, the French painters for the most part eschew vehicles altogether. Indeed, they go to the other extreme by employing colours as free from oil or medium as possible.

Very little medium should be used to thin a light colour with, when it is intended for solid painting.

All mediums become horny in time, when too

much is used, and this change is more visible in light colours than in dark ones.

Should a colour be found inconveniently thick for work, which is often the case, it can be made thinner by the addition of a little raw linseed or nut oil.

In the works of the Dutch and Flemish schools we have excellent evidence of the proper use of mediums, and, to a great extent, the preservation of these works is due to the judicious use of them.

Every painter, after a few years' practice in his art, usually selects that particular medium or vehicle, to mix with his colours, which has chanced to have found most favour with him. He is sometimes so unduly warped to its imaginary merits, that he is induced to condemn all others. The student is often bewildered, and in the utmost uncertainty as to what medium he ought to adopt. Amongst the many advisers which he often finds, and from his own want of knowledge on the point, he not unfrequently selects one, the least eligible for his purpose.

Sugar or acetate of lead, sulphate of zinc, gum mastic, plaster of Paris, boiled oil, maguilps, etc., etc., are all used as dryers, all of which are quite unnecessary, and what is more, most of these substances seriously interfere with the permanence of any work in which they may be present.

In warm weather pure raw linseed or nut oil is generally sufficient, for mixing with all opaque colours to give them a drying quality. When transparent colours are used, and more especially

when glazing with them is desirable, good Copal or Amber varnish, to which a little raw linseed oil has been added, is all that is necessary to mix with them. Time has proved these ingredients to be more permanent than anything else. Should this medium be found inconvenient to work with at first, practice will soon overcome the difficulty.

When the madders are used, a little Copal varnish alone, may be mixed with them to make them dry.

The author has gone very carefully over the evidence furnished by ancient writers on art, as well as the experiments detailed by modern chemists, referring to the materials used as mediums for painting in oil in the fourteenth century.

The only conclusion at which he has been able to arrive in connection with his own practice is, that gum Copal and Amber, in combination with nut or linseed oil, were the chief ingredients employed to give to colours the consistency necessary for the painter's work. This preparation was subsequently employed to cover pictures with when finished.

The early works in distemper, produced prior to the discovery of oil-painting in the fourteenth century, received a coat of varnish, mainly for protection, as soon as they were finished, and which varnish has been pronounced after analysis to consist for the most part of Copal and Amber.

It is easy to suppose that in a short time after the period referred to, this preparation would naturally

suggest itself as being suited for mixing directly with the colours themselves, in place of the distemper or glue size, which up to that time had been in use, and which had been attended with so much inconvenience.

The fact of Copal and Amber Varnish having been used by the earlier painters in distemper, to cover their works with in the manner alluded to, it was only necessary to move one step further to arrive at the discovery of *oil-painting*. This was done by adding such an oil to the too quickly-drying varnish, as would sufficiently retard its siccative qualities, and make it more manageable when combined with the colours. It appears certain that either nut or linseed oil, or perhaps both, were used for the purpose referred to. By mixing this medium directly with the colours before they were applied to the panel, it would give to them that consistency and readiness for use, as compared with the earlier process, that would soon revolutionize the pictorial arts of that period, and which, as we know, actually did take place.

This was really the nature of the discovery in oil-painting, made by the early Flemish painters, and for which J. Van Eyck and his brother have obtained the credit.

It is probable that the early Flemish painters used their colours for the most part separately, when glazing them on the white ground. They calculated the effect, as well as the hue they required, and

appear to have been quite alive to the advantages of this method of working, relative to the permanence of their productions.

All the shadows and darkest parts are heaped up above the surface of the picture, the result of laying on the transparent colour, combined with a varnish vehicle, by repeated efforts. The half-tints and lights are sunken, having been produced mainly by thin glazes, over the white distemper ground.

It must be remembered that the whole of the meguilps are of comparatively modern introduction in oil-painting. Doubtless they assist colours to work pleasantly, more especially in the process of glazing. It is also a fact that the indiscreet use of them has contributed greatly to the ruin of many fine works. Numerous recipes have been handed down to us from the time of Van Eyck, for the composition of vehicles for oil-painting. After they have all been duly considered, we gather that the three best contained resins, Amber, Copal and Sandarac. The two first were dissolved in either nut, poppy, or linseed-oil; the last in an essential oil or spirit, and all were used as vehicles with the whole of the colours employed. At the present time there is no process by which Amber varnish can be made suitable for light colours, the preparation being always very dark, in consequence of the great heat to which the amber and oil have to be subjected, in order to liquify the amber. Therefore, whenever pure Amber varnish was used by the earliest oil-

painters, it could only have been with the darker colours.

It has been thought by some that a process of bleaching Amber varnish has been lost, and that another process could not be discovered. But as all varnish preparations were made in the house of the painter, with the simplest means at his command, it is difficult to suppose that modern chemistry could not supply all that the painter of former times could accomplish in this direction.

It is most probable, as we have inferred, that Copal was used in the earliest oil-pictures, and it is reasonable to assume that it was mixed with the lighter colours, instead of Amber, or perhaps in combination with it.

Copal is soluble in linseed or nut oil at a much lower heat than amber, and the varnish produced by these ingredients is of a paler colour, than Amber varnish. This peculiarity fits Copal varnish for mixing with all colours, but with the lighter ones more especially. In some respects Sandarac resembles Copal, but it is unlikely that it was much used, as it would not work in so friendly a manner with the oil-colours as the two other resins would do.

Amber has been found in combination with some of the colours in the works of the early Flemish school, but we have no evidence that it was not always mixed with some of the lighter coloured varnishes, such as Copal, already referred to, and which in all probability was the case. It is also

most likely that both Copal and Amber varnish, were always employed by the earliest Flemish painters, and in combination with either nut or linseed oil, and that they were mixed with all their colours as a vehicle, before they were applied to the panel. Moreover, it is also very probable that such vehicles have conduced to that permanence in these early works, which now distinguishes them from all others. Should this assumption be correct—and it appears to be so—it furnishes a substantial reason, why we ought to adopt Copal and Amber varnish with the addition of oil, as a vehicle for all oil-pictures now executed, and abandon the use of meguilps altogether. One point, however, must be insisted on, and it is, that the Copal and Amber varnish be prepared from resins of the best quality, and quite free from adulteration. These resins carefully dissolved according to one of the ancient processes which have been handed down to us, would form the best preparation for pictures. Combined with linseed oil, they would give a medium resembling as nearly as possible that of the early painters, and this, if discreetly employed, would have an enormous influence in making modern oil-pictures more permanent than they are at present.

A work painted with the vehicle alluded to, when dry, might receive a thin coat of Mastic varnish, for its further protection. In the course of time, and when it was felt desirable to remove this covering,

it could be done without risk to the painting. The Copal and Amber varnish with which the work was originally painted, would resist the action of turpentine and alcohol, which are the solvents usually employed to remove old Mastic varnish from pictures in the process of cleaning.

The use of mastic mediums during the last hundred years, has been amongst the chief causes of deterioration in the oil-pictures produced. When mastic is combined with boiled linseed oil, it forms the vehicle known as meguilp, and which has been so much employed in more modern times. The coagulated substance, which the mastic, boiled linseed oil and litharge, form, is so pleasant to work with, that it has allured many painters to the most indiscreet use of it. When employed in glazing it often becomes greatly discoloured. Whenever the varnish of a picture is required to be removed, where Mastic meguilp has been freely used, the work is in great danger. The solvents which are employed to remove the varnish, also attack this meguilp, and many fine works have been ruined in consequence of this.

Much of the varnish sold under the name of Copal varnish, is not what it is represented to be. In some instances, it does not contain a particle of copal. This fact has prompted the writer to give special attention to the matter, seeing that so much depends on it. Arrangements have therefore been made with Messrs. Mander Brothers, varnish-makers, of

Wolverhampton, to prepare pure Copal and Amber Varnishes for the painter's use.

This firm has undertaken to manufacture the varnishes or vehicles referred to, in accordance with the old formulæ supplied by the author. They correspond as nearly as possible with those employed by Van Eyck and the early Flemish painters, and the preparations may now be procured in the usual way.*

TURPENTINE.

It is not generally known that the use of turpentine with colours, is in many instances detrimental to their permanence. The mixing of turpentine with colours when painting, explains much of the change which we often see takes place in a day or two after they have been applied to the canvas. This sometimes arises from the impurity of the spirit, or from some material of a caustic nature, being mixed with it to clarify it. But oftener it is the result of the immediate contact of one colour with another, which the use of turpentine favours. Many colours are chemically antagonistic to each

* Since the publication of the former edition of this work, the author has been induced to superintend the preparation of the varnishes alluded to. The undertaking has been a troublesome one, but in the interests of art alone, he felt called upon to do this. The materials may now be procured from Messrs. Mander Brothers, 363, Oxford Street, W.

other, even when carefully manufactured. Mixing them with turpentine brings them into contact so closely, that they begin to act on one another immediately they come together, when a visible change soon ensues.

Flake White and Rose Madder, mixed together with turpentine, or with any medium in which it is present, will sometimes change in twelve hours. Should the Rose Madder have been adulterated with Cochineal Lake, a very marked change will take place in a few hours, and more especially in the presence of white lead.

The use of turpentine with colours also assists in producing fissures in a work. In evaporation it carries off with it some of the oil with which the colours are mixed. They are then left without sufficient elasticity, and in drying they contract, and the numerous small fissures which we so frequently find in newly painted pictures are much due to this cause.

OIL OF SPIKE LAVENDER.

The frequent reference to Oil of Lavender, which has been made by the writers on art of the fourteenth and fifteenth centuries, in their recipes for varnishes and vehicles for painting in oil, shows that it was often used amongst the painters of that period.

The early painters of Bruges in all probability

used Oil of Spike Lavender, either instead of turpentine or in combination with it.

It has been pointed out that much of the turpentine now sold is detrimental to the stability of colours when mixed with them. If its use were to be replaced by the essential Oil of Lavender no change need be feared; and it would serve to thin colours and vehicles, quite as well as turpentine.

It appears therefore desirable that the essential Oil of Lavender should take the place of turpentine on the palette, in readiness to combine with colours, as well as to thin the Amber and Copal medium when too thick for use.

PREPARATION OF COLOURS, MATERIALS, ETC.

The conditions under which a painter commenced his education in former times were totally different from what they are now. In the early days of art there were no artists' colourmen, as at present, to provide materials. There was much work to be done outside the actual pursuit of painting. The difficulties and inconveniences of preparing canvases and panels, and the manufacturing of brushes, colours, and vehicles, had frequently to be overcome in the studio of the painter. These were impediments in the way to the actual pursuit of painting, but they appear to have had the good effect of sharpening the appetite of the real student, making him doubly eager to follow the more pleasant part of his occupation, when the time arrived for him to do so.

Of necessity, the early painters had to prepare, or have prepared under their own eyes, the materials necessary for their work. To learn the art of painting, years of apprenticeship had to be served in the painter's atelier.

The time of the student was at first chiefly occupied in the preparation of materials for the use of his master and the advanced pupils. With knowledge acquired in this way, it can be readily understood why it is, that the paintings by the old masters are in such good preservation, as compared with those of modern times.

Pictures should be produced with great care as to the materials employed, so as to escape as much as possible those forms of change or decay to which they are usually subject after they leave the studio. If only a year or two is sometimes sufficient to dim the brilliancy of works even by our best painters, what will be their appearance at the end of a couple of centuries?

This is not enough considered in these days by painters. They rely too much on the colourman to furnish all they may require, and scarcely ever trouble themselves with anything of the kind, beyond the actual production of the work they may be engaged on.

It is a very remarkable fact that those pictures which were produced about the year 1400, when oil-painting was first introduced, and when the process was in its infancy, are in a better con-

dition than those which were painted centuries afterwards. Some of the works by Van Eyck and his brother, painted about this time, are in a wonderful state of preservation, free from the usual evidences of decay, and as bright and clear in colour as though just painted.

This is mainly the result of the materials having been properly selected, and carefully prepared and employed. These facts greatly concern modern painters, and should be matters for their anxious consideration.

MIXING, AND NATURE OF COLOURS.

English oil-colours are nearly always too stiff for use when first squeezed from the tube, and more especially Flake White. When this is the case it is best to begin work by first thinning the white, with nut or raw linseed oil; good nut oil is the best. This should be done whether it is intended to mix tints or not. All other colours, when too thick, must be thinned with linseed oil, to which a little Copal and Amber varnish is added; and in winter time it is better to mix linseed oil with Flake White. Nut oil is less liable to turn white yellow than linseed oil. It has not the drying quality of linseed oil, but white lead, being a dryer in itself, does not require assistance in summer-time.

The Madders, Raw Sienna, and some of the darkest colours, should be mixed with a little pure

Copal varnish, as these pigments will not dry readily without help.

A little observant experience will, however, soon suggest which colours require the assistance of a dryer, before application to the canvas.

Much has been written on the qualities and habits of pigments and vehicles intended for the use of the painter, and it would almost appear that he need not concern himself further in this direction, but simply take what is offered by the colourman. This view is incorrect, for during the whole of his career he will be annoyed with changes of one kind or other connected with his materials, of which he should always try to ascertain the cause. Indeed, the permanence of his works will depend on this kind of observation.

In saying this, it is not intended that the painter should absorb himself too much in experiments with colours and vehicles, for this would be loss of time. The course is now being made pretty clear of impediments, both chemical and mechanical, notwithstanding the drawbacks referred to, and if the student will make himself acquainted with what has already been done in this way, he need not trouble himself very much further about these matters.

A long list of colours, now manufactured, ought never to have had the least consideration of the painter. Their beauty nearly always fascinates the inexperienced, and in ignorance they are employed indiscriminately.

Pale Cadmium, which is so tempting a colour,

and which surpasses every other yellow in beauty, is one of the most fugitive of all pigments. It is not only liable to change in itself, but it affects nearly all colours with which it is combined.

With Flake White, Lemon Cadmium will sometimes become nearly black in a day. It is a chemical compound of the metal cadmium with sulphur, and the heat employed in its manufacture, is not sufficiently great to ensure permanence of colour. The sulphur being imperfectly united with the cadmium, attacks the white lead with which it is mixed, or rather combines with it, when sulphide of lead is formed, which is of a dark colour.

Reference is made to this pigment in particular, as it is much used by landscape painters. The change in the greens so much complained of, is due very often to the employment of this colour. It should, therefore, never be used without the greatest caution.

It may here be remarked that when any of the cadmiums are used to form tints, it is always safer to mix Zinc White with them, instead of Flake White. Although those bordering on orange are not so liable to change in combination with white lead (Flake White) as the Yellow Cadmium is, it is better not to bring them into contact with pigments which are at all likely to affect them, or be affected by them.

Cadmium has not been used more than about forty-five years, and we are, therefore, only imperfectly acquainted with its habits as compared with our knowledge of the older colours.

Zinc White, has not so much body as white lead, but its enduring qualities, when pure, ought to recommend it to the painter's use. It is not affected by other colours, neither does it interfere with any pigments when properly prepared.

One of the chief causes of the unstable character of modern colours may be attributable to insufficient washing, and too speedy preparation.

Of late years there has been great competition in the prices of colours, oils, and varnishes, and even the best colourmen have felt it necessary to keep pace with it. This has induced quicker methods of preparation, as well as more extensive adulteration.

If a thoroughly careful and conscientious course were to be observed, it would be of the greatest advantage to art.

Let some colourman begin anew, by taking special care that all the materials which come into his hands are pure, and that the washing and grinding of certain pigments be as perfect as possible. Let him also supply only those colours which he knows to be of the best quality and permanent. Or if he chooses to sell those which are semi-permanent and fugitive, let this be indicated on the usual label attached to the tube or cake, so that painters may be made aware with what they have to deal.

The price of such materials might be raised according to the extra time and care given to their preparation. There can be no doubt that any colourman who would take the matter up in this form, would

soon have the best part of the business to himself, for at the present time no such person exists. The formation of a body or society for the preparation of painters' materials, under the immediate control and direction of painters of repute, would doubtless be still better.

Cheapness, or rather low price, should be the last thing an artist ought to think of in relation to the cost of his materials.

There is no kind of manufacture more deserving of consideration, than that of making painters' materials, and more especially that relating to pigments. This is at once evident, if we realise that from a few tubes of colour, of small comparative cost, a work of the value of hundreds, and sometimes thousands of pounds, is often produced. When it is considered that the permanent or fugitive character of such works, is to so great an extent in the hands of colourmen, their responsibility is certainly very great.

In order to ascertain if colours change, and how soon such changes may take place, the painter should try experiments for himself. Let certain pigments be taken both mixed and unmixed, and matched with such objects of permanent colours as may be in his possession, as glass, enamel, porcelain, etc. These colours or compound hues might be put upon the things referred to. After they have been allowed to remain upon them for a few weeks, any change that may have occurred will be easily seen.

In some cases the painter will be astonished at the rapidity and extent of the alteration in these trial colours, and by this experiment he will be able to ascertain very distinctly what colours to employ, and what to avoid.

A pigment, when well prepared, may be quite permanent, but careless preparation, adulteration, or insufficient washing, will not only render it fugitive, but damaging to all other colours which come in contact with it. Take Zinc White, which has been either imperfectly made or adulterated, as an example of instability, but which is permanent when properly made. This pigment is often so badly manufactured, that when employed at all thinly, it flies away in a few weeks. This may be seen by covering over with it, a chequered or figured surface of light and dark colours, or dark grey and white, making the darker parts almost invisible with the Zinc White. In a little time these marks will begin to reappear, through the white, and in the space of a month or two, they will be nearly as visible as though nothing had been put upon them.

Should suspicion be entertained of the permanence of a colour, experiments ought to be made with it at once, in order to ascertain if the doubt be well founded. A number of tints with the suspected colour and Flake White, should be mixed. It should also be compounded with other colours, which in the painter's opinion have been, or are likely to be affected by it. Patches of these tints and hues might then

be put on a piece of mill-board or canvas, and hung in different situations, more or less likely to affect colours of any description. Of course each patch or trial of colour should be numbered, and the same entered in a memorandum-book; corresponding with such number, the colours which may have been employed to form the tint or hue, should be named, as well as the vehicle which was mixed with them, with any remark that the painter might have felt necessary to make at the time.

If this kind of experiment were to be followed up for a few years by various painters, and at the end of that time they compared notes with each other, most valuable information would be obtained; and being put on record, it would be of the utmost importance to the painter and his art.

The painter should always make an effort to use as few colours as possible, and they should be of the most permanent kind. The use of a limited palette with the old masters was a necessity, and this explains, to a great extent, the good condition of many of their works at the present time. It must not be forgotten that many colourmen manufacture their goods to sell, and almost irrespective of their final use in the production of costly works of art. The most fugitive colours may be obtained from them, as well as the most durable, and the painter who is uninformed as to the nature of colours, generally employs them all indiscriminately, and of course, to the detriment of his work.

Painters often attach themselves too much to the use of some special colour for certain purposes. This is also a mistake. There is so much in practice, that if the painter sees the true colour of the object he wishes to imitate, and is acquainted with the full power of his palette, he will not find it necessary to tie himself strictly to the use of any particular colour, so long as others at his command are not fleeting.

Some colour-makers are in the habit of mixing bright and cheap colours with the dull ones, such as Yellow Ochre, Light, Venetian, or Indian Red, Terre Verte, etc. The purpose is to make them attractive to the buyer. Bright colours of the kind alluded to, should be regarded with suspicion, for although they may produce pleasing results at the time they are used, in all probability they will not be found permanent.

SUPERIORITY OF PANELS TO CANVAS.

On looking through the works of different schools, countries, and periods, exhibited last winter (1880) at Burlington House, with a view to examine their various states of preservation or decay, no one can doubt that those pictures which have been painted on panel are in a much better condition than those painted on canvas.

Pictures on canvas are much more subject to deterioration, than those on panel.

In many of these works the evidence of injury resulting from damp situations was obvious, particu-

larly that from the moisture of the walls against which they had been hung. The patches of discolouration and mildew were some of the indications of this. Where the paint had been thinly laid on the canvas, it was occasionally very conspicuous.

Then again, the texture of certain kinds of canvas tends to the secretion of dirt, which after a time cannot be removed without damage to the work.

When a canvas is not wedged up tightly, wrinkles sometimes occur, and any motion which may be induced by the looseness of it, will produce cracks. The numerous cracks which are to be found on old pictures painted on canvas, are for the most part due to this cause. So long as the paint is elastic, this kind of injury will not show itself, but so soon as it is quite dry, it becomes very brittle, and the least bending of the surface will crack it. Canvas is also incapable of resisting a blow, and the pressure of a nail from the back may make a hole in it. Even chalk marks on the back of the canvas, may cause cracks on the front surface to correspond.

Panels are less liable to any of these risks, and they are capable of resisting most other injurious influences to a greater extent than canvas.

Of course there are certain disadvantages in connection with panel pictures, which are not common to pictures on canvas, but they may be all provided against.

Both large and small cabinet pictures ought to be painted on panel, when the durability of the work is

of consideration. Works painted by the same master, at the same time, and on the two materials referred to, show a very marked difference in their states of preservation in favour of the use of panel. When the work has been painted on canvas, the colour has sunken and become comparatively dull to what it originally was. Many of those works which are on panel are as brilliant as if only just painted.

The works by Rubens are singularly illustrative of this. All of those which have been executed on panel are bright and fresh-looking, while those which are on canvas, although painted with a thick impasto, have gone down very much.

The works by Teniers, Ostade, Metzu, Terburge, and others, also show this peculiar difference in condition, where the two materials have been employed by the same painter.

In the Price-Owen collection, now in the gallery at the South Kensington Museum, is 'A Portrait of a Lady,' by Sir Joshua Reynolds, painted on panel, which was unusual with this master. The preservation of the picture is in every way so perfect, that it looks as though it had only recently left the easel. This beautiful work is so vivid, clear, and free from cracks and fissures, that it is an excellent example, showing the superiority of the panel over canvas.

The writer has seen most of the works by Sir Joshua, which have been publicly exhibited during the last twenty-five years, and he does not recollect

any work on canvas, by the same master, approaching it, as to its state of preservation.

There will be found many pictures on panels, by all the early masters, which have suffered from various causes. But then in all probability their state would have been much worse, had they been painted on canvas. These panel pictures may have been subjected to influences which most likely would have entirely annihilated works on canvas. In fact, from the appearance which many of them present, this must have been the case.

In some instances, the paint is seen peeling from the surface of the panel. The underground of the picture appears to have been composed of animal glue size, and whiting. The form of decay alluded to has no doubt arisen from attacks of damp through the back of the picture, which decomposed the size with which the priming was made. The adhesive quality of the whiting preparation thus destroyed, the whole of the substance would in a little time leave the surface to which it was originally applied.

If the backs and edges of the panels had been well covered with oil-paint, or with a coat of wax and turpentine, in all probability the injury alluded to would not have occurred to them.

In most instances, when a picture on panel has suffered, it might have been easily prevented by a little forethought.

DAMAGE TO OIL PAINTINGS BY DAMP AND GAS.

Deterioration in pictures is sure to take place under the most favourable conditions. Even when the knowledge of the chemist is combined with the skill of the painter, certain changes will go on more or less, although in most instances they may be nearly imperceptible. But when proper care has not been taken as to the materials on which the picture is painted or the preparation of grounds, in the choice and mixing of pigments, and in the use of vehicles, in order to prevent deterioration as much as possible, it ought not to be a surprise, if changes show themselves very rapidly in various ways.

Oil pictures commonly suffer from being attacked at the back by damp from the walls on which they may be hung.

The canvas on which they are painted is often so incapable of resisting moisture, that it not only soon becomes rotten, but the damp finds its way through it, to the colours on the front surface.

This form of decay, for the most part, may be prevented, or at least checked, by painting the back of the canvas with a coat of white lead.

Painters' canvas is usually prepared by first covering one side of it with a coat of whiting, to which glue size has been added. Although the top surface of this preparation is afterwards protected by the coats of oil-paint which it subsequently receives, that part of the glue and whiting which is

immediately attached to the canvas, is always liable to be affected more or less by damp.

No doubt the coat of whiting and size absorbs a portion of the oil from the colour, which is afterwards laid upon it, to finish the surface; nevertheless, this is attended with uncertainty, and the consequences are accordingly very serious.

It is not unusual to find the back of a newly painted picture covered with a compact fur, or fungus.

In such a case an organic change has taken place in the priming of glue and whiting, the effect of damp on the glue size, and which, if not arrested, will ultimately end in the destruction of the picture. Whenever this may have happened, a certain damage will have been done to the work which cannot be repaired, and this will be more distinctly shown in the course of time, by the paint peeling off the canvas wholesale.

In rooms where gas is used for lighting, any textile fabric which may be in them greatly suffers. Indeed, in some instances, a few years are sufficient to effect complete decay. This is shown by the breaking of picture-cords, window-blind-cords, etc.

The backs of oil-pictures on canvas are subject to the same influence. It must therefore be seen that unless they are protected, destruction must ensue.

It may be said, in answer to this, that oil pictures on canvas may be lined, and relined when necessary; and this is quite true. At the same time, it would

be a mistake to suppose that a work escapes injury whenever this is done.

The writer is well acquainted with the various processes resorted to for cleaning, restoring, and lining pictures, and feels assured that every effort should be made to protect works of art from the necessity of undergoing any operation of the kind. A coat of oil-paint, applied to the backs of canvases, will prevent the form of decay above alluded to.

When canvas is used, the smooth kind is the best for small or moderate-sized works, and when very high finish is deemed desirable. Canvas of a rough surface is not so well adapted for works of this class, as it interferes with the proper effect. But for paintings of large dimensions, and when high finish is not intended, then either Roman canvas or ticking are preferable.

COLOUR OF GROUND FOR PANELS OR CANVAS.

The ground of the canvas or panels on which pictures are intended to be painted should always be of a light colour, and the permanent brightness of a work will much depend on this.

If a dark ground be employed, it will soon show through the light colours thinly painted on it.

Many of the pictures of the old Spanish School, being painted on a dull red ground, have become so dark, that the thinly painted parts are scarcely discernible.

Nearly all the works by Nicolas and Gaspar

Poussin are painted either on a red or umber ground, and the colour of the works of the former, which was never pleasant, has at length become very offensive; this is due to the change referred to.

Everything considered, a pure white ground is preferable to all others, and pictures which have been painted with a fair impasto on a white ground, have been found to survive the ravages of time the best.

PICTURE FRAMES.

The frame of a picture has two functions to perform. First, it should be of a character suited to the work it is intended to surround. In separating a picture from the other objects or works of art, which may be on the walls of a room, the frame should enrich it, but not overpower it. The picture should not be too much embedded in the frame, but rather brought to the front part of it. The width of a frame should have due relation to the size of the picture for which it is intended, and the peculiarity of the moulding, as well as the ornamentation of the surface of it, should be well considered. Second, a picture frame ought to have its place in regard to the wall-decoration of a room, and of which in fact it forms an important part. As such, a frame at its outer edges ought not to start for several inches at right angles from a wall. But it should, in nearly all cases, rise gradually from the wall

surface to its greatest thickness. If this be observed, the frame will appear to belong not only to the picture it enriches, but also to the wall on which it may be placed, and it will then take a proper part in its adornment. It is remarkable to find how much these conditions in modern times have been overlooked and ignored. The early Venetian masters appear to have had more appropriate ideas as to the treatment of picture frames, than any other painters of more recent times.

The framing of water-colour drawings often requires consideration, different to that which may apply to oil-pictures.

Many works in water-colours are now painted equal in strength in all respects to oil-paintings. When this is the case, they should be framed very much in the same manner as oil-paintings, and although fashion may destine them for the drawing-room, they ought nevertheless to be supported with suitable frames. When, however, a drawing is of the usual character, the frame should be lighter. In nearly all cases, drawings ought to be framed with a gold flat coming up to the edge of the work. Drawings which are very light and sketchy, should have white mounts round them, but they should not be so wide as those usually applied.

A white mount generally gives a look of undue superiority to an inferior work, and the uninitiated are often deceived by this trick.

BRUSHES, ETC.

Good tools are indispensable to good work.

They should always be kept clean and in proper order.

Whenever it is practicable, it is desirable that hog-hair brushes should be employed to lay on colour, in preference to sable.

When this is done with due intelligence, the work will be much more satisfactory than when performed with sable brushes.

There is often a feeble look about a work executed with sable brushes, which is rarely the case when hog-hair tools have been used.

Brushes must always be washed with soap and water at the end of each day's work. After they are wiped with a towel, they should be drawn to a point, and allowed to dry thoroughly. By this practice the points of the brushes, which are so essential in working, are preserved. If this habit is not observed, brushes will not yield readily to the will of the painter, and they are soon unfit for use. If students do not keep their materials in good condition, their general success is interfered with, and the interest is checked which ought always to be felt in their work.

The study of art in itself is difficult enough, and no unnecessary impediment ought to come in the way, in the form of imperfect materials, to make it more so.

The habit should be formed early of using brushes as large as possible. By doing so, the quality of the work will more likely be better than when small ones are used; and what is still more important, the student will be obliged to work slower and with more deliberation.

When painting with large brushes, every stroke must be well guided, or confusion and emptiness will soon be the result. Every touch, when well directed, will then probably be the just embodiment of the eye, the mind, and the hand, which last should ever be the obedient servant of the two other agents. The hand should never be permitted to work on its own account, a habit which we so constantly see.

The use of small brushes always favours poor work. They do not require so constantly directing as large ones do. They cover but a small space on the canvas at a stroke, and therefore will not go so far wrong as a large one would do without proper direction.

Small brushes encourage a thoughtless and idle method of working, most damaging to the education of the student, while insipidity or inanity will most likely be the chief features of the work itself.

The forms of brushes are of some consequence with most painters. Animal, and landscape painters occasionally have brushes specially made for them. This was the habit of Sir Edwin Landseer. Round tools are best suited for some kinds of work, while flat ones will do other kinds better.

Ordinary intelligence is, however, usually sufficient to suggest what may be required in such matters, after a little practice.

If one may judge from observation, it is the habit of all students, when beginning to paint, to hold a brush in the mouth. This no doubt arises from the difficulty felt at first, of holding in one hand a sheaf of brushes, together with the palette and mahl-stick. This practice should be guarded against.

Oval palettes, made either of walnut, sycamore, or satin wood, are found to be the most agreeable for oil-painting. Mahogany, although so much used, is not a pleasant wood for the purpose.

For water-colour painting, papier-maché palettes will be found very serviceable. They can be had of any tint, and as large as those generally used for oil-painting, and are not too heavy.

CARE AND TREATMENT OF PICTURES.

Oil-paintings should never be turned with their faces to the wall. Both old and new works become discoloured by exclusion from light. Newly painted pictures in oil-colour, undergo a rapid change when placed in the dark. White first becomes a dirty yellow, and ultimately turns to a light brown. Every other colour, whether mixed or unmixed, is affected in the same way, although the change may not be so apparent as it is in the light ones. This deterioration arises chiefly from the darkening of the

oils with which the colours may be mixed, or the vehicles used to convey them to the canvas.

A painting discoloured by the cause referred to, may be partly restored to its original condition by exposure to full light for a few weeks.

If the darkening of a picture is due to some chemical action in the colours themselves, which is not unfrequently the case, the original condition of the work cannot be restored.

VARNISHING PICTURES, ETC.

The application of a thick coat of varnish to an oil-picture as usually practised is a mistake.

The chief use of varnish is to bring out the full value of the darker colours, and to protect the work generally from dirt, and from the action of injurious vapour. A very thin coat of varnish is always sufficient to do this.

Soon after a painting is finished, a smear of medium, composed of raw linseed oil and Copal varnish, may be rubbed over the surface of it. At the end of three years, and after it has been carefully sponged with a little cold water to remove the dirt, a thin coat of Mastic varnish may be applied. In a little time after this has been done, a bloom will most likely appear on the surface of the picture. This may be removed easily by lightly rubbing it with an old silk handkerchief, or a piece of soft wash-leather, on which a little raw linseed oil has been placed. The surface thus produced will keep in good condi-

tion, under ordinary circumstances, for many years, and without any further varnishing.

When varnish is put upon oil-pictures too soon after they are painted, it tears up the partially dried colour, and produces fissures which are nearly always irreparable. Nevertheless it is desirable that the surface of the picture should be protected by varnish, as soon as the paint is dry enough to receive it, for all colours will deteriorate unless this is done.

ASPHALTUM AND FUGITIVE COLOURS.

Notwithstanding the fascinating peculiarities of Bitumen or Asphaltum, they should never have a place on the painter's palette. They are not pigments, but simply pitch or deeply coloured varnishes.

They never dry as colours do, but alter with the temperature, whether the result of the sun's rays or the fire of a room. That preparation usually sold under the name of Bitumen is only Asphaltum, with a little boiled oil, Mastic meguilp, or wax, added. These ingredients give to it that consistency which we find, when squeezed from the tube. By these additions it is intended that Asphaltum should be more eligible for the painter's use. This is a delusion, and the damaging effect on any work where it may have been applied, is only a question of time. Notwithstanding that painters are frequently aware of the bad results of the use of Asphaltum in

pictures, they are tempted, by the beauty of its hue, to try further experiments with it in their own way, and they rather persuade themselves, that their own special method of application, will overcome its objectionable tendencies.

Sir Joshua Reynolds, Wilkie, Jackson, Opie, and other painters have used Asphaltum in many of their works, and the wide fissures with which we find some of them covered, are the result of its use more than anything else. All this shows very clearly that we ought to avoid Asphaltum.

Many of the fine portraits by Sir Joshua have been painted in combination with Asphaltum and fugitive colours. We are able to form an idea of what he used, from Northcote's notes in his life of Sir Joshua, and also of the cause of the changes which have taken place. The earlier part of his career was devoted to experiments, but they appear to have been in no way made with reference to the permanence of his productions.

The chief purpose of Sir Joshua was to obtain some oil-vehicle, or pigment which would assist him in giving the likeness or peculiarity of surface of the object he wished to imitate, as also to obtain tone in combination with brilliancy of effect; and he appears to have forgotten every other consideration in this effort. He used the yellow and red preparations of Arsenic, Orpiment, and Realgar; pigments of the most fleeting kind, as well as the most injurious to those colours they come in contact with. Wax, Bitu-

men, Mastic, Carmine, the whole of the Cochineal lakes and other materials, equally unsuitable for oil painting, were also employed to aid him in his endeavour to imitate what he saw in nature.

FISSURES.

It frequently happens that in a week or two after a work has been painted, small cracks or fissures are to be seen all over the surface of it, but more especially in the darker parts.

When a work has been swiftly painted, or executed at one sitting, this defect is found to occur still oftener. It is caused by the contraction of the colour in drying. The oil with which the pigment was mixed by the colourman, was not sufficiently elastic to admit of that contraction which always takes place from the action of the air. The colourman finds it necessary to mix his pigments, when preparing them, with nut or poppy oil as well as with linseed oil, to prevent them from drying in the tube, or becoming fat by keeping. If too much of the two former oils is present in a colour, its elasticity is interfered with, and as a consequence the colour divides in drying. When turpentine is used to thin colours, it also assists in producing fissures. In the evaporation of the turpentine, some of the oils are most likely carried off with it, leaving the colour insufficiently elastic to remain intact.

In all probability the old painters ground their

colours in linseed oil as they were required, which prevented defects of this kind.

GLAZING OIL PAINTINGS.

Now that most of our rooms, both public and private, are lighted by gas, it is desirable that any oil-paintings which may be contained in them, should as far as practicable be protected with glass. Pictures which have been painted with semi-fugitive colours, and are exposed to the influence of gas, must change immediately. Those painted with colours which may be permanent under fair conditions, will often soon fade or blacken, in the presence of the burnt gas from the ordinary gasalier of a room.

A coat of good varnish will do much to protect paintings from this influence, but this cannot be applied with safety until some years after a work has been executed. An oil-painting produced with good colours, and protected from bad air by glass, will keep perfectly fresh and without the least visible change for at least a quarter of a century.

Although the inconvenience produced by reflections in the glass is often great, it is of little consideration as compared with the deterioration and ultimate destruction of valuable works of art, and which the application of glass so much prevents.

THE PAINTING-ROOM.

The painting-room should be lighted from the

north or north-east. From any other aspect sunlight would interfere too much with the work.

For ordinary work the bottom of the window should be at least six feet from the floor of the room. When a painting-room is specially built, the window may come near to the floor; the lower part might then be covered up with drapery according to the light required. For figure subjects the light should be of a concentrated character. Rembrandt, and other masters of his time, preferred a very narrow aperture for the light, and the peculiarity of effect given by these painters to their works, is mainly due to this arrangement.

It is very difficult to paint a good portrait in a diffuse light.

Some of the heads by Rembrandt are painted from a model lighted from an aperture not more than eighteen inches square, while the painter himself received light for his work from another source.

With the landscape-painter it is quite different. He generally paints his pictures from sketches previously prepared from nature; consequently, he only requires a full and good light. It is not necessary for it to be from the north; and sometimes a large top light is preferable to all others.

The walls of the painting-room should be of a warm grey, which may be made with white, black, Yellow ochre, and a very little Prussian blue in combination. The tint should be rather dark, so as not to give back much light.

Such a tint, whether obtained in a paper-hanging, or a distemper colour, will form a most pleasant background for furniture, pictures, and the usual objects of the painting-room. It is also very well suited as a general background for the living model. When, however, it is intended to give an outside effect to the objects to be represented, the upper part of the walls of the painting-room should be of a lighter colour than the lower.

The chocolate-coloured tint, which has been so much employed in England, not only in studios but in public buildings and picture galleries, is simply hideous.

No one who ever felt colour truly, could have had the least sympathy with it, employed as it has been in this country without any balance or contrast.

The floor of the painting-room should be covered with linoleum or something of that kind, and of an agreeable hue. On this material a number of worn and faded rugs might be placed here and there, and in such positions as would best suit the convenience, taste, and comfort of the painter. These rugs might be taken up readily, when required, and freed from dust, and the linoleum wiped over with a wet cloth, to remove lint and dirt. A well-worn Turkey carpet in the middle of a painting-room supplies a pleasant covering for the floor. The surrounding margin, which it may not cover, if painted over of a dark and good colour, always produces a pleasant effect.

Of course the furniture of the studio should be care-

fully selected. If the room is intended for a figure-painter, every object acquired should have some relation to its future usefulness in this direction.

When the purchase of old tapestry can be made, nothing produces a more agreeable effect on the walls of the room, and it is always useful. Apart from its decorative character, it forms a ready background either for sitters or furniture.

For figure-painting a large studio is a necessity. Some of the old masters had magnificent ateliers; and the best painters on the continent, as well as those of our own metropolis, always aim at obtaining as large a room for their work as possible.

It is a great advantage to have gas arranged in the painting-room, so as to be able to light objects by it. Both studies and pictures painted under an artificial light are usually very telling, and the practice is most instructive. By this means a richness of effect is obtained, which cannot be gained in any other way. Many of the works by Rembrandt are notorious for their mysterious and beautiful effect, produced under an artificial light. Indeed, he has shown more fully than any other painter has ever done, how much may be achieved with the most commonplace materials, lighted by an ordinary oil-lamp. The productions of Michael Angelo, Caravaggio, Spagnoletto, Riberra, and others, were mostly painted by lamp-light, and they clearly indicate how much we may be able to profit by the like practice.

METHODS OF PAINTING.

The various methods of painting practised in both ancient and modern times, are not equally productive of lasting effects. On the whole, solid painting is found to be the most durable. The system of obtaining the greys in flesh-painting by scumbling, is a convenient and ready one, but ought to be employed with much judgment, or the colour will soon change. When the tint forming the scumble is nicely calculated, no doubt a more delicate and transparent grey will be the result than when produced by solid painting. The process, indeed, resembles that of nature. Much of the grey tint which we find in flesh is the effect of a thin, semi-transparent, and delicately coloured skin, covering a darker substance underneath, and thus producing those subtle blue and green greys on the surface, which the best colourists alone are able to imitate.

The colours over which a scumble is placed ought never to be too dark, nor indeed much darker than the scumble itself, or they will soon eat through it.

At one time it was the practice of Titian and other Venetian masters to paint in the dead colouring of their work solidly. White, black, and a little Indian red in the shadows were used for this purpose.

Over this preparation the true hues of the objects were painted with transparent colours, introducing in the lights and half-lights opaque and semi-

opaque colours. Glazing was not confined to the deep shadows and dark half-tints, but the local hues of objects were often represented by this process. The method has been followed with success in continental schools, as well as by painters in this country. Studies, or copies from Titian's works can be best made by this process. Indeed, such pictures as the 'Entombment,' in the Louvre, or the 'Peter Martyr,' could only be well imitated by this system of working, and it will also be found to be more enduring in its effects than most others.

It is the practice of some painters, when they require dull tints, to produce them by mixing several bright colours together, with the addition of white. This should never be done. Whenever the tint required can be made with the more sombre colours, the brighter ones should not be employed for the purpose. As a rule, bright colours are more fugitive than dull ones, and, when they are mixed together, they become still more liable to change. Most of the bright colours are chemical productions; the manufacture of them is often very imperfect, arising from various causes, not easily controlled. Any slovenliness on the part of the workmen engaged in their preparation, and which it is to be feared but too often occurs, would not only render a colour fugitive in itself but damaging to those with which it may come in contact.

It will therefore be seen, how much more likely bright colours are to change than dull ones, the

latter being either native earths or mineral substances, and little affected by time.

The tints used for flesh-painting in modern times frequently change very rapidly. This is often due to the use of bright and fleeting colours, such as the lakes from cochineal, Yellow Cadmium, the light madders, impure Orange Vermilion, etc. When the tints required for flesh can be produced by mixing white with the ordinary Vermilions, the iron reds (Light, Venetian, or Indian-red), the Ochres, the Siennas, the Umbers, and the Naples Yellows, they may always be relied on as permanent.

The bright colours will of course produce more fascinating tints, but they will not last so long as the dull ones.

IMITATION OF SURFACES.

The imitation of various surfaces, by what is commonly known amongst painters, as texture or "quality," ought to be of consideration with the student.

Certain surfaces may be best represented by intelligent brush work, and manipulative skill, rather than by an effort of absolute imitation.

The quality of the furs of certain animals, draperies, the texture of fruit, and the foregrounds of landscapes, etc., etc., may often be better expressed by clever brush work and "quality," than by attempts at actual imitation.

Sir Edwin Landseer possessed unusual skill of

this kind, perhaps even to a greater extent than any other painter.

When the process is carried too far, the effect becomes offensive and vulgar, and it is then very justly called "trick." So that much discrimination is necessary, in order to make the fullest use of mechanical means, and manipulative skill, without carrying them over the line of fitness and propriety,

It is much better to err on the side of elaborate imitation, than to fall into methods of imitative trickery.

GENERAL REMARKS ON THE PRACTICE OF PAINTING.

The old painters of different schools and countries have employed various methods in the technical use of colours, for the pictorial representation of objects. Several of these methods were so perfect, that they have been constantly adopted in more modern times, down to the present. Indeed, in the hands of the painter who is acquainted with their resources, they furnish everything that can be desired.

In the works of the Venetian School, we have the most complete evidence of power in this respect, which the technicalities of art can give.

The works by Bellini, and other painters of his time, present to us their systems of thin painting over white grounds, and which were most likely prepared in distemper.

These grounds have great power to reflect light,

even when the colours are painted over them. At this period, manipulative skill was not so much the aim, as refined realization. The full power of the material was not then known. But when Titian, the pupil of Bellini, and Giorgione, had made themselves fully acquainted with the means at their command, they were soon able to develop a system of painting, and a manipulative knowledge, which has never been surpassed.

The life of Titian was one of experiments in his art. At the early part of his career he painted in the manner of his master. But in a short time this was embarrassing to him, and also insufficient. He then had recourse to painting in his subject in light and shade, in the most solid manner; depending on glazing for that harmony and depth of colouring, which we see in his best works. Painting solidly with opaque colour, and glazing afterwards, was also the habit of Giorgione, the two Palmas, Tintoretto, and Paolo Veronese. Painters of less notoriety, and living at the same time, also pursued this method of working. In Flanders it was copied by Rubens, and adopted by Vandyke and other pupils of Rubens. The works of Rembrandt also owe much to it. In England the most perfect exponent was Sir Joshua Reynolds. It is in fact, the only method of painting in oil suited to the execution of large works.

The pictures of the old Dutch School are perfect, as small examples to students, showing the techni-

calities of art. Those by Adrian Brauwer and A. Ostade are for the most part produced by solid painting, and with glazing on the top of it. The original ground is rarely if ever to be seen. The productions of David Teniers the younger are painted in a different way. His aim was always to paint everything at once, which indeed he did with an alluring facility. This method enabled him to show his underground, which gave great transparency to the work. By this prompt, judicious, and almost playful manner of working, a charm is given to his productions which more elaborate systems cannot supply. Every art student should study very carefully the pictures by this master, as well as those of the Dutch School generally, for they will best furnish him with the means to understand the language of his art, and most readily assist him to apply it in his own work.

EFFECTS OF YELLOW.

It is a curious fact, that when the colouring of a picture is not in harmony, it is mainly in consequence of there being either too little or too much yellow in combination with some of the colours in the work.

Let the experiment be tried of placing together colours which are out of harmony with each other. Then let the painter add to, or take from them the amount of yellow which he may feel necessary, to

bring the whole into harmony. If this be properly done, the desired effect will be produced, and the picture will be in perfect harmony.

The whites are often too cold, or too warm; the reds, blues, greens, and greys, may also be deficient in this respect. Or the general aspect of the picture may be such as to require treatment in the way pointed out, to bring it into harmony as a whole. It is also found that if a colour in a picture be not in general harmony with the work, such colour will not only be imperfect in itself, but all those colours or hues which happen to be in juxtaposition, and which may be correct, will appear to be out of harmony also.

The colours in most old oil-paintings, whether good or bad, are usually in harmony with each other. This arises from the yellowness of the varnish which covers the surface, and also from the discolouration of the vehicles, etc., with which the works have been painted. When these yellow coverings have been removed from old pictures in the process of restoration, it is not uncommon to find the work underneath the varnish very inharmonious.

In such cases it has sometimes been supposed that the glazings have been taken away which have produced this change, and which is often the fact; but more frequently the alteration is due to the removal of the yellow varnish referred to.

A badly coloured picture will always look fairly well by gas or lamp light. This is in consequence of the rays of light from these sources being yellow. The effect is that of a yellow coat of varnish over the work.

BAD EFFECTS OF SCUMBLING, ETC.

Changes in oil-pictures frequently take place from the injudicious use of scumbling.

A thin scumble of light colour is sometimes applied to a dark surface. When this is the case, a change for the worse will be the result in a short time afterwards. It is the habit of light colours, when thinly scumbled over dark ones, to become fugitive. It is also the peculiarity of dark colours to show through a thin scumble more and more as time goes on. It will therefore be seen that here are two elements more or less productive of change.

This can be guarded against by taking care that the surface over which it is intended to apply the scumble be not too dark.

In the practice of painting, effort should be made to lay the colours on the canvas at once. When the desired effect can be obtained at one painting, it is much better than when arrived at by repeated paintings. Too much disturbance of colours with the brush produces muddiness. When they are brought into immediate contact by much mixing, they are not so likely to be permanent as when the

opposite practice is followed. Excessive mixing brings the particles of colours into close contact with each other, and favours thereby a chemical change and deterioration.

In the present day enough effort is not made to imitate natural objects at one painting alone. It has been assumed by many painters, that in order to obtain the full effect of nature, several paintings are necessary. This is an error into which most art students fall, and the more readily because the theory favours loose and half-hearted work, inducing them to rely too much on the last painting for the production of the required effect. It is pretty certain that nearly everything in nature may be fully imitated at one painting, and that it only requires proper skill to do this, may be seen by the works of the best masters, both of the past and present time. This method, no doubt, requires clear thought, direct purpose, and careful observation. But work done in this prompt manner must always have a more fascinating effect on the spectator than that produced by repeated painting.

Sometimes artists are in the habit of painting their works in a dark key, in imitation, as they suppose, of those by the old masters. This is even done by men of eminence, and is productive of mischief amongst students, who often aim at imitating in their work the peculiarities of their seniors. An old painting, as seen to-day, has undergone a great change since the time it was first

produced. In most cases the colours have become mellowed and subdued by time. But when we consider the effect which would be brought about by the application of from twenty to thirty coats of varnish at various periods, with a certain amount of dirt interposed between each coat, together with the repeated injuries of the picture-cleaner, during the course of centuries, it can easily be supposed that all old paintings, however good their state may now be, can bear but little resemblance to what they were when they left the painter's hands. The peculiarities produced by time, discoloured oils, varnishes, and reparation—all of which present themselves in old pictures—are imitated wholesale by some painters. They forget, or they act irrespective of the fact, that an excess of varnish or oil in a painting, will in a comparatively short time ruin it.

The old painters appear to have had a clearer idea of the fitness of the materials for their work than more modern painters. It is remarkable that the works by the chief of the old masters are free from those marks of decay, and evidence of ignorance as to the materials used in them, which we find in more modern works. Take for example those of the English School, which are covered with wide fissures, many by Sir Joshua Reynolds, Opie, Sir David Wilkie, and others. These injuries are most likely due to the use of either wax or bitumen, and often to the employment of water-colour on the top of oil-colour.

GLAZING.

Glazing, so called, is performed by passing one colour over another in combination with vehicle. The colours usually employed for this purpose are transparent, but opaque colours such as Light red and Yellow ochre may also be used.

The ground should always be lighter than the colours glazed upon it. The purpose of glazing is to give depth and richness. The local colours of an object may often be best represented by glazing alone on a white ground.

Excessive glazing produces an unsubstantial effect, and gives too much the look of coloured glass rather than the appearance of nature, and is the cause of blackness, and a "horny" surface.

IMPASTO IN OIL-PAINTING.

When painting with white or with light tints, it will be found that the greatest power of reflecting light is obtained where the colour has been laid on the thickest.

White, or tints of the description alluded to, employed thinly, are not nearly so powerful as when laid on with great body.

The part of the work which is intended to be the brightest and most powerful should therefore receive the greatest body of colour, and sometimes be loaded with it.

It is always best to keep the shadows thin in

colour, for they will keep their places better when this is the case.

In the course of the work the painting will often be found to have acquired a roughness beyond what is desirable. When this is so, any marks of the brush or raisings of colour, which may appear to interfere with the surface of the work, when seen at the proper distance, should be carefully removed. This may be done in several ways. If only a few lines or small lumps of paint occur, the knife will soon remove them without scraping. When the texture is uniformly too rough, it may be reduced by scraping it with a razor or common table-knife made very keen, or by sandpaper or cuttlefish. Before, however, any application of this kind is made, it should be first ascertained if the paint is dry enough to allow of it.

RAPID SKETCHING.

Sketching from nature should be the constant practice, not only of every art student, but every painter, however advanced he may be in his career. Some of the studies made, ought to be of the most careful character possible, while others should be executed against time, and in a very rapid manner. These two methods of study should be carried on together every day; in fact, the practice is indispensable with the student. Such a habit of working will alone enable him to copy nature in her most fascinating, but often her most fleeting guise.

The best effects being usually very transient, the combined power of swiftness and accuracy will be found necessary, in order to obtain a representation of them.

The power to work swiftly and accurately, is quite another thing to working slowly and well, and unless this double power be acquired, the painter will fall short in his work.

No mere sketching power alone, will ever enable a painter to suggest a fact with due intelligence. To sketch with full knowledge, must be the outcome of more earnest, accurate and complete work.

Sketching which is not based on thoroughness, usually results in bad work. It may be showy and pleasing to those who do not properly understand art, but to those who know better, it is little more than unmeaning emptiness.

It is much more difficult to express in painting, a fact slightly and well, than to represent it by careful and elaborate manipulation. The one being accomplished by restrained power and cautious suggestiveness, while the other is the result of labour and painstaking deliberation.

It is an excellent practice to make rapid studies in water-colour from pictures by the old masters; just blots of colour in flat washes. Of small cabinet works, two or three studies a day might easily be made. Such recollections will be found of the utmost value to the art student, and they ought

always to hang in his presence in the painting-room. This quick kind of work, supposing it to be careful at the same time, will also help the student in his general practice. Studies of the figure from the life, landscape, drapery, furniture, flowers and fruit, and still-life, or anything else suggesting good colour, or light and shade, should be constantly made in the same rapid and intelligent manner. Such a habit of working evolves, so to speak, a facility and readiness to see and seize on anything that may present itself as serviceable to the painter.

PICTURE RESTORING.

At the time a work is being painted, the painter should always bear in mind that if any change takes place in it after it goes from his hands, the result of imperfect knowledge on his part, of the materials used, or of the mode of using them, it cannot be made good by the so-called restorer.

Any excess of medium or oil, or any indiscreet use of varnish, should be carefully avoided.

We have been told that injuries of this kind may be rectified by cleaning, but experience tells us that a picture rarely ever passes through the restorer's hands without being the worse for it.

Various methods have been, and still are, employed to remove varnish from oil-pictures. Two in particular have usually been resorted to, namely, those by friction and solvents.

Both of these methods are attended with the greatest danger to the picture.

Nothing can be more ruinous to an oil-painting than the practice of cleaning by friction.

The freckled look which many old pictures present is due to this process, and it is quite impossible that it can be otherwise. The lower interstices of the surface cannot be reached by friction, before the higher prominences are damaged.

The process of removing old varnish from a picture by solvents is often equally disastrous. It should never be attempted unless the cleaner understands the process by which the picture was painted. The absence of proper skill is very evident in most of the old paintings which have been cleaned by solvents. The ordinary substances used are alcohol, turpentine, and sometimes linseed oil in combination.

As a rule, neither turpentine nor oil will dissolve old varnish, but by mixing alcohol with either, or both of these fluids, a dissolvent is formed. When too much alcohol is used, the greatest danger may be apprehended, and it is mainly in consequence of the too free use of this agent, that so much damage is done to oil-paintings during the process of cleaning. To stop the action of even the weakest and mildest solvent, at the right moment, requires more skill than the mere picture-restorer ever possesses; and it is absolutely impossible for the restorer to proceed safely unattended with the experience of the painter. Even when this double knowledge is

acquired, the operation is exceedingly difficult, and always dangerous. Varnish often unites with the surface of the picture itself, so intimately, that the removal of the one interferes with the security of the other, and even in the hands of the most experienced, damage to the work, to some extent, is certain to ensue. This is especially the case where a picture has been varnished too quickly after being painted.

In the shop-windows of picture-restorers so called, we sometimes see what are intended to represent examples of their skill. They take an old picture —usually a portrait—and free it entirely from dirt and varnish, as well as the top glazings of the picture, in accordance with their own nostrum. Over one half of its surface they then pass a coat of dirty brown colour and varnish, much darker than the usual accumulations of this kind, and this is so cleverly done, that to the ordinary observer it has exactly the effect of old and discoloured varnish. The other half of the painting is left clean and free from discolouration. It is intended that the spectator should assume that the discoloured portion of the picture presents the work in an unrestored condition, and that the light part represents the cleaned portion, as well as the skill of the restorer. This of course is altogether a delusion.

HABITS OF WORKING.

When painting in oil, at the end of a day's work,

most likely some colour will be left unused upon the palette. This should be thrown away rather than saved, and the palette thoroughly cleaned in readiness for the next day's work. Colours left during a night, are usually unfit for use, and are an impediment in various ways to good work.

The habit of going over the doings of each day, with the view of appointing the work for the day following, should be formed early, as this greatly facilitates successful study.

It is a good custom to take a slip of paper and quietly look over the work in hand, noting down from time to time everything which may appear to require alteration, and when beginning to work again, look over the notes and proceed to make the alterations accordingly.

In the arrangement of a subject, it is more convenient that the light should come over the left side of the painter.

When painting with the light from the right, the shadows of the brush and mahlstick fall on the canvas and interfere with the pleasantness of the work.

Care should always be taken to paint far enough away from the sitter or subject. When this is not duly observed, the objects in the picture will appear to be sliding out of it, and the perspective will look wrong. The painter should not look down upon his subject, nor should he take into his picture more than may be contained within an angle of sixty degrees.

If the room in which he may have to work is inconveniently small, which is often the case, the difficulty may be met to a certain extent by sitting on a low seat.

The relation of objects in natural foregrounds to those which recede from them, should be carefully noted.

All objects become smaller and lose their strength of dark and colour as they leave the foreground. Those which are in the extreme distance are the lightest. Pictures ought to be proceeded with, keeping these facts in view. In landscape-painting it is very important that they be carefully considered. The gradations from the foreground to the most distant parts, are termed aerial perspective.

It is best to try to see the whole of a subject at the same moment, and note the gradual change which takes place as the objects become more and more distant.

In looking through a window to the opposite side of a street, the passers-by will appear in full strength of light and shade and colour. But if these latter are viewed with the sides or bars of the windows, as forming the front objects of the immediate foreground, it will be found that they will appear very indistinct by comparison.

The habit of comparing objects with each other at various distances from the foreground, should be constant, as on it will depend the power of the

painter to represent their relations with each other, in accordance with the aerial perspective of nature.

With regard to the propriety of mixing tints with the palette-knife previous to beginning to paint, there is a division of opinion on the subject amongst painters. Much depends on habit, and doubtless either practice will end in the right result if carried out with intelligent observation and perseverance. Still, there are certain advantages to be derived from mixing a few tints with the palette-knife, in general imitation of the objects intended to be represented. By doing so, less work will have to be done with the brushes, and the execution will most likely be simpler.

The subtler gradations can be more easily mixed and applied to the canvas, when tints are partly prepared with the palette-knife beforehand.

When colours can be laid on the canvas, and the required effect obtained by partially mixing one with another, the result is usually more satisfactory than when more complete combination takes place, and the colours used are also likely to be more permanent.

Effort should ever be made to paint up to the full brightness of nature. The highest lights become the soonest dulled by age, however bright they may have been at first. Unless this practice had been observed by the best painters of former times, their works would not have been in that excel-

lent condition in which we now find so many of them.

Brightness may be produced in two ways: by the whiteness of the underground, and also by a fair impasto in the lightest parts of the work.

During the progress of a work, it is often difficult to determine what parts are the most necessary to be carried forward first.

In many instances, several parts of the picture may no doubt be continued simultaneously with equal propriety. At the same time there will always be found portions of the work which should progress in proper order and sequence, and if this is not duly observed, it will most likely suffer.

With many students the most pleasant parts of a picture, are executed first, and are carried unduly forward. This is the result of impatient anticipation. When such is the case, it nearly always happens, that those parts of the picture which are not so interesting, are executed with insufficient attention and earnestness, and as a consequence the work is ultimately brought to an unsatisfactory completion.

BACKGROUNDS.

When drawing from nature, whether the figure, drapery, flowers, fruit, or still-life, the background intended to be represented in the work, should always be placed behind the object itself, when practicable. Deviation from this rule, invariably leads to difficulties, and more especially with young

students who are not able to calculate the effect of the object at all correctly when a different practice is followed.

Backgrounds, both in studies and complete pictures, ought to receive more consideration than they usually do. The habit of rubbing in something of an indefinite character, although so much the practice, is not a good one. A threequarter-length portrait as painted in these days, is often only supported with a disagreeable mass of brown colour for a background. This is done to save labour and thought, and some of our best portrait-painters are not exempt from the practice. A different treatment was always observed by the old portrait-painters in their best works. Many portraits which have come from their hands appear to belong to some great historical work, and the backgrounds, sometimes of landscape and sometimes of architecture, always gave to them that interest and dignity which are so much admired in them. No doubt the best portraits were chiefly executed by historical painters, and in these works they brought to bear their fullest knowledge, when they were called upon to paint them. It was only compatible with the general practice of the old painters alluded to, that their single figure pictures or portraits, should partake of the character of their more important works, and more especially as to their treatment of backgrounds.

SELECTION, ETC.

The power of selection is a most important matter for the consideration of the painter and art-student, and without this power, any chance of success is almost hopeless.

The capacity to pick out that particular part of nature which is worthy of the painter, and suited to his purpose, appears to be the result of natural aptitude more than anything else, and no power of imitation alone, can atone for the absence of it.

In looking over the annual exhibitions throughout the country, we never fail to see the most conspicuous want of this faculty in the painter, and perhaps in his landscapes more than in other kinds of work.

Some painters appear to imagine that a mere topographical transcript of a scene without selection, will meet the conditions required in a work of art, so long as it is imitated fairly well. But this kind of work is not true art. It may be the art of imitation, but that is all; and in many instances, works of this character are not of so much consequence, as the lowest kinds of still-life painting.

Students are always very solicitous about the kind of manipulative appearance their works ought to present, and not unfrequently form incorrect ideas on the subject.

We are constantly hearing of the 'nice touch' in works, by the uninitiated; and it is thought by many

amateurs that if they could only obtain this quality in their productions, they would have nearly everything that could be wished for.

Doubtless a pleasant mode of execution is a great fascination with every painter. With some it is the sole aim, to the neglect of the more essential qualities of art.

It may be said that all kinds of manipulative skill or dexterity of hand, are absolute emptiness, unless accompanied with the true expression of the object intended to be represented.

Smoothness of work is usually attended with insipidity, and is less to be preferred to that intelligent brush work, which expresses with freedom the peculiarities of things.

Form, light and shade, and colour, may be given in all truth by a comparatively few strokes of the brush; and this is indeed the highest kind of manipulation. In such a case nearly every touch will most likely be the concentrated and successful effort of the eye, the mind, and the hand—all acting in unison to one end. When manipulation of this kind is present in a picture, the spectator has qualities to dwell upon which justly give him great pleasure, apart from any other merits which the work may possess.

The size of the picture, to a certain extent, should regulate the kind of manipulative skill displayed. And small cabinet works should be as perfect as possible in this respect; while larger ones, intended

to be seen at a greater distance, need not be so carefully considered.

The best paintings by David Teniers the younger, regarded as small works, are perfect examples of the kind of skill to be aimed at by the student. Those by Paolo Veronese and Titian stand unrivalled amongst the larger works of the Old Masters, as examples of fine executive power, and which all painters may study to the greatest advantage.

Students are in the habit of losing sight of the real purpose of their work. They do not sufficiently realize that they ought to work not so much for the production of the drawing or painting they may happen to be engaged on, as to obtain information and experience in their art. The work produced should be looked upon quite as a secondary matter, and incidental to the more important object of study, namely, that of acquiring knowledge. Everything which goes from the hand of the student, whether sketch or finished work, should be as complete as possible.

A sketch in its way may be exhaustive. The boundary of the forms should be correct, the general effect of light and shade, though slight, should be truthfully expressed, and if colour be attempted, it should also bear a good general resemblance to the colour of the object intended to be represented.

A complete work should have all the qualities above named, but expressed in a much more perfect manner. Nothing should be left incomplete, and

the struggle with difficulties which are sure to arise, should be maintained to the last degree, and indeed until the work is as perfect as the student is able to make it.

The effort to do all that might be done is not usually sufficiently considered by the art-student. He is but too often impatient to change his work, and only for the sake of change, as he finds it too uninteresting and tedious to grapple with the difficulties attending completion. When such a habit has grown beyond a certain limit, it becomes confirmed, and the case is hopeless. To begin a work is not at all difficult, and anyone can do this; but it requires quite a different capacity to carry it to a successful completion. With some people pleasure must attend all their efforts, and immediately they get into the least difficulty with their work, they lose courage and begin anew. This habit alone, is often the explanation of an unsuccessful career, always beginning and never completing.

REPAINTING.

In order to ascertain if the parts of a picture recently worked upon are dry enough to proceed with, it is only necessary to breathe upon them. Should they become dull on the surface, it is an indication that the work is dry enough to be carried forward. But should it present patches unaffected by the breath, such parts are wet, and may not be interfered with. When the whole has become dry,

and it is necessary to repaint or retouch the work, before doing so, again breathe on it, and while the surface is dull, apply to it, with a stiff brush, a little raw linseed oil.

This will help the fresh colour to unite with that previously laid on, and cause it to work pleasantly, which it would not do without this assistance. Care should be taken that not more than a smear of oil be applied to the work in this operation, and that it be not rubbed too hard with the brush.

WATER-COLOUR PAINTING.

A few words will suffice about water-colour painting. The art is only a few years old, so to speak, and may be said to have been originated and developed in this country. The early Italian and German masters, certainly did paint on paper with a wash of colour in light and shade, touching on the lights either with white lead or whiting, to which an adhesive substance was added. But it remained for English painters to carry out fully, that which up to more modern times had been only suggested.

The resources of water-colour painting are not so great as those of oil-painting, consequently little can be said about them. Most of the colours employed in oil are suited for water-colours. White lead is replaced by Chinese White, which is so well prepared by the colourmen that the painter may always use it without the least concern, either as to permanence, or general fitness for his work.

Zinc White is used as a water-colour, and also a preparation of baryta, which in all respects answer perfectly the purposes required of them.

The discovery of Zinc White, soon gave a new expression to water-colour art. It was first used in a sparing manner, and only parts of the picture were touched with it, more especially the high lights and small details, which could the more readily be imitated with body colour than by leaving the lights.

As the powers of this new pigment became obvious to the artist, and to the oil painter in particular, it was made to do that work in water-colour painting, which Flake White was doing in oil, until at last Zinc White (Chinese White) was combined with all the pigments used in water-colour painting, much in the manner of tempera painting.

Of course there were, and still are, cries against the use of white in this form. These objections are more matters of sentiment than anything else. The fact is, Chinese White requires more skill to use properly, than painting simply with transparent colours.

With some painters this skill is never acquired. In many works the presence of Chinese White is so disagreeably conspicuous that the spectator is never able to forget it.

But when we see how thoroughly this material has been made subservient to the intentions of the painter, as in the works of William Hunt, D. G. Rossetti, Burne-Jones, and others, it must be felt

that water-colour painting has gained enormously by the discovery of Zinc or Chinese White. When well made, this pigment is not affected by contact with other colours, nor does it injure any with which it may be mixed.

In the former edition of this manual, no reference was made to the necessity of obtaining well-made paper for water-colour painting. Nevertheless, it is of the greatest consequence that the manufacture of this material should have every possible care and consideration at the hands of the maker.

No water-colour painting can be lasting, unless the material on which it is painted is well prepared, well washed, and free from destructive chemicals.

Formerly paper was much better made than it is now, and good linen rags were chiefly used in its composition. Cheaper materials are at the present time employed, and alkalies are used for bleaching and other purposes, which are rarely ever got rid of. Some colours are immediately attacked when applied to paper which has not been well washed.

This matter appears to be entirely in the hands of the colourman to control. It could not be difficult for him to arrange with some papermaker to produce this material specially suited for the painter's use, and free from the destructive agents referred to. The price would of course be greater than that paid for the ordinary kind, but that ought not to be of the least consideration to the painter.

It has been a question as to which of the two

kinds of painting, oil or water-colour, is the more durable.

It must be remembered that all the causes of deterioration in paintings, are not common to both processes.

Oil-paintings often suffer from the discolouring effect of the mediums with which the colours are mixed, and from the application of varnishes after pictures are finished. They are also liable to injury from fissures and cracks. These are the peculiar disadvantages which affect the permanence of oil-paintings.

Water-colour paintings suffer in other ways. They are readily attacked by damp, and, unlike oil-pictures, there is nothing mixed with the colours capable of resisting moisture. When water-colour drawings are hung against a damp wall, or placed in a damp room, they may be ruined in twelve months, or even less time.

Works of this description are also more subject to change from bad air, there being no protection on the surface in the form of varnish. To a certain extent, the glass will shield the work from the causes of discolouration of this kind, but it is almost impossible to exclude damaging vapours from a picture by such means, for any length of time.

We know that pictures painted in oil will resist the effects of time for centuries, and the vicissitudes to which they are usually subject. But we have no such assurance relative to water-colour painting,

as the art is not more than a hundred and fifty years old.

All the works which were produced at the early part of this period are greatly changed, and some of them are worthless as works of art. They were chiefly executed in transparent colours.

If it were possible to protect water-colour paintings from the influence of damp and bad vapours and sun-light, there can be but little doubt that they would be at least as enduring as oil-paintings; but until this has been effected, the chances are against it.

Water-colour paintings may be protected from damp in a much more perfect manner than they usually are. Seeing that most of the injuries which happen to drawings of this description arise from damp, every effort to prevent them ought to be made. The simplest way to effect this is to cover the back of the frame and back-board with a material capable of resisting damp. This may be either prepared paper, or thick canvas painted over with oil-colour. The glass should always be well secured in the frame, and the drawing made air-tight from the front.

Various mediums are prepared for water-colour painting, and most of them are of no real use.

The dark colours, when employed in deep shadows, require assistance to give them transparency, and bring out their full depth and richness. Gum-tragacanth is used to a great extent for this purpose, as it produces a moderate glaze

on the surface of a work, when combined with colours.

So far, this is satisfactory; but it will also be found that this gum imparts a turbid quality to the dark colours, the result of its being in itself only semi-transparent.

Gum-arabic is the simplest and best medium to assist the transparency and depth of water-colours, and when discreetly used, will meet every requirement.

It may be added that an effort should always be made to do without vehicles of any kind, rather than to seek their aid to obtain the desired effect.

A water-colour painting, if executed with Chinese White, in combination with the colours, and exhausting the full power of the palette from light to dark, will be found more powerful than an oil-picture produced in the same manner.

The dark parts of the work, if assisted by the addition of a little Gum-arabic, may be of the depth and richness of a work in oil-colour.

If Chinese White be freely and properly used in the lightest part of the work, it will be brighter than the lightest parts of an oil-picture painted in the same key.

Chinese White being more dense, and the particles more compact than the Flake White employed in oil-colour, it is capable of reflecting more light.

The ordinary sable and hog-hair brushes used for oil-painting are very well suited for water-colours.

At times they are preferable to all other kinds, while they are less expensive than good water-colour brushes.

The practice of putting the brush in the mouth when painting in water-colour is bad, injurious both to the general health and the teeth. No doubt a certain convenience is felt in doing this; but if the student will accustom himself to free the brush from excess of water or colour by drawing it along a piece of folded blotting-paper, it will meet every necessity.

SOUND ELEMENTARY STUDY THE FOUNDATION OF ALL SUCCESS.

Students are generally very anxious to begin to use oil-colours, to 'paint in oils,' as they sometimes call it. They suppose there is some mysterious virtue or merit in the materials alone, which will atone for a want of knowledge of drawing, and light and shade. This elementary knowledge ought always to be acquired by the simpler means, previous to using either oil or water-colours.

If the difficulties of drawing with chalk, etc., have not been fairly well overcome, it is improper to add other difficulties, and more especially those of painting in oil and water-colours. Yet this is constantly done, not only in private institutions, but in schools of art.

To paint properly with oil-colours, the full resources of the material should be known and

exhausted. To mix and muddle colour ground in oil is not oil-painting.

To use either oil or water-colour in a proper manner, every stroke should be well aimed, and the peculiar functions of the materials ascertained. This can only be done by the more elementary work being thoroughly carried out as a preparation. Impatience to do what previous study has not prepared the student to undertake intelligently, has led to blundering efforts and final disappointment, where more elementary training would have ensured success.

He who attempts to run before he can walk may expect to stumble, and finally fall.

INDEX.

THE END.

LONDON: BAILLIÈRE, TINDALL, AND COX, KING WILLIAM STREET.

Human Anatomy and Physiology, illustrated by a series of Movable Atlases of the Human Body, showing the relative positions of the several parts, by means of Superposed Coloured Plates, from the designs of Prof. G. J. WITKOWSKI, M.D.

***** A Companion to every work on Anatomy and Physiology.**

Part I.—Neck and Trunk. With Text Descriptive and Explanatory of the physiology and functions of the several parts. By ROBERT HUNTER SEMPLE, M.D., F.R.C.P. Lond. Price 7s. 6d.

Part II.—Throat and Tongue, showing the Mechanism of Voice, Speech, and Taste. Text by LENNOX BROWNE, F.R.C.S. Edin., Senior Surgeon to the Central London Throat and Ear Hospital. Price 7s. 6d.

Part III.—The Female Organs of Generation and Reproduction. Text by JAMES PALFREY, M.D., M.R.C.P. Lond., Senior Obstetric Physician to, and Lecturer on Midwifery and Diseases of Women at, the London Hospital. Price 7s. 6d.

Part IV.—The Eye and the Apparatus of Vision. Text by HENRY POWER, F.R.C.S., Senior Ophthalmic Surgeon to, and Lecturer on Ophthalmic Surgery at, St. Bartholomew's Hospital, Senior Surgeon to the Royal Westminster Ophthalmic Hospital. Price 7s. 6d.

Part V.—The Ear and Teeth. The Mechanism of Hearing and of Mastication. Text of the Ear by LENNOX BROWNE, F.R.C.S. Edin., Senior Surgeon to the Central London Throat and Ear Hospital; Text of the Teeth by HENRY SEWILL, M.R.C.S., formerly Dental Surgeon to the West London Hospital. Price 7s. 6d.

Part VI.—The Brain (Cerebrum, Cerebellum, and Medulla Oblongata) and Skull. Text by T. STRETCH DOWSE, M.D., F.R.C.P. Edin., Physician to the Hospital for Paralysis and Epilepsy, formerly Medical Superintendent of the Central London Sick Asylum. Price 7s. 6d.

Part VII.—The Male Organs of Generation. Text by D. CAMPBELL BLACK, M.D. Price 7s. 6d.

***** No such simple, reliable, and comprehensive method of learning the several parts, positions, and functions of the body has hitherto been attempted; the entire Series being unique, will be most valuable to the Teacher, the Student, and to all who wish to become acquainted with the anatomy and physiology of the human economy.**

Text-Book of Anatomical Plates, designed under the direction of Professor MASSE, with descriptive Text. By E. BELLAMY, F.R.C.S., Surgeon to Charing Cross Hospital, Examiner in Anatomy, Royal College of Surgeons, Professor of Anatomy, Government Science and Art Department. Second edition, price, plain, 21s., hand-coloured, 42s.

"Undeniably the most beautiful plates we have."—*Lancet.*

"With these plates, the student will be able to read up his anatomy almost as readily as with a recent dissection before him."—*Students' Journal.*

The Essentials of Anatomy. Designed on a new and more easily comprehensible basis, as a Text-book for Students, and as a book of easy reference to the practitioner. By W. DARLING, M.D., F.R.C.S., Eng., Professor of Anatomy in the University of New York, and AMBROSE L. RANNEY, A.M., M.D., Adjunct Professor. Price 12s. 6d.

"The arrangement of the subjects, their detailed treatment, and the methods of memorising, are peculiar to the authors, and are the results of long experience in the teaching of students. There is, in fact, an individuality about the work, which gives it a peculiar value to the student and practitioner."—*New York Medical Record.*

The Stars and the Earth; or, Thoughts on Time, Space, and Eternity. Revised and enlarged, with Notes by R. A. PROCTOR, B.A., Hon. Sec. to the Royal Astronomical Society. Thirteenth Thousand, price 1s.

Neurasthenia, or Brain and Nerve Exhaustion. A Paper read before the Medical Society of London. By T. STRETCH DOWSE, M.D., F.R.C.P. Ed., Physician to the Hospital for Epilepsy and Paralysis; formerly Medical Superintendent of the Central London Sick Asylum. Price 2s. 6d.

Deafmutism, and the Education of Deaf-Mutes by Lip-Reading and Articulation. From the German of Dr. HARTMANN, of Berlin. Translated and enlarged by Dr. JAS PATTERSON CASSELLS. Price 7s. 6d.

"Contains so much real information that we can honestly recommend it to anyone seeking for knowledge."—*Lancet.*

"For the sake of these unfortunate deaf-mutes, who are now treated on the wrong lines, Dr. Cassells' book should be read and well considered."—*The Citizen.*

Food; its Varieties, Chemical Composition, Nutritive Value, Comparative Digestibility, Physical Functions and Uses, Preparation, Preservation, Adulterations, etc. By the late HENRY LETHEBY, M.B., M.A., Ph.D., etc. Second edition, enlarged, price 5s.

"Dr. Letheby's position and authority on the subject of food is so pre-eminent, that a book from his pen is above criticism."—*Lancet.*

"Either as a text-book for schools or as a household guide, it is excellently adapted."—*Public Opinion.*

Field Geology, with a Section on Palæontology. By W. Hy. Penning, F.G.S., of H.M. Geological Survey, and A. J. Jukes-Browne, B.A., F.G.S., of H.M. Geological Survey. Illustrated with woodcuts and coloured map. Second edition, revised and enlarged, price 7s. 6d.

"Satisfies a want which has long been felt and frequently expressed."—*Nature.*

"Others have taught us the principles of the science, but Mr. Penning, as an accomplished field-geologist, introduces us to the practice."—*The Academy.*

Engineering Geology. By the same Author. Illustrated with coloured map and woodcuts, price 3s. 6d.

"A full and lucid description of surveying and mapping, the diagnosing of the various minerals met with, the value of sites and rocks for engineering operations, etc."—*Popular Science Review.*

The Hair; its Growth, Care, Diseases, and Treatment; with Historical Chapters on Fashions in Hair and Beards from the Assyrian to Modern Times. By C. H. Leonard, M.A., M.D. With 116 engravings, price 7s. 6d.

"Is entertaining reading, will afford many useful hints to the practitioner, and be much appreciated by the public, especially the fashionable portion of it."—*Lancet.*

A Manual of Sanitation; or, First Help in Sickness and Injury. A pocket companion for officers and privates in the army or volunteer forces in peace and in war. By the same Author. Second edition, price, cloth 2s. 6d., or cheap edition, paper wrapper 1s.

"It is a most useful and practical manual, and, as the instructions are simple and reliable, it should be placed in the hands of officers and men alike."—*Medical Press.*

Handbook of Popular Medicine for Family Instruction and Reference; for colonists, travellers, and others out of reach of medical aid. By G. H. Napheys, A.M., M.D. With movable plate and 100 illustrations. Price 7s. 6d.

"We have rarely read any form of domestic medicine so simple, yet reliable."—*Public Opinion.*

A Physician's Sermon to Young Men. By William Pratt, M.A., M.D., etc. Second thousand, price 1s.

"The delicate topic is handled wisely, judiciously, and religiously, as well as very plainly."—*The Guardian.*

How to Feed an Infant. With an Appendix on the Common Ailments of Infancy, with their Hygienic and Curative Treatment. By Benson Baker, M.D. Price 1s. 6d.

"Popularly written, and sensible in the highest degree, its widespread perusal would help to bring about a more rational system of bringing up infants."—*Graphic.*

"Based upon the wide and practical experience of the Author."—*Society.*

Practical Guide for the Young Mother. From the French of Dr. Brochard, Director-General of Nurseries and Crêches, with Notes and Hints by a London Physician. Price 2s.

The Child, and How to Nurse it. By Alex. Milne, M.D., Vice-President of the Obstetrical Society of Edinburgh. Price 2s. 6d.